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THE HISTORY OF THE CONTAGIOUS CHOLERA; WITH FACTS EXPLANATORY OF ITS ORIGIN AND LAWS, AND OF A RATIONAL METHOD OF CURE.

By JAMES KENNEDY,
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ERRATUM.

Page 227, for "any derangement of the functions of the body," *read*, "any derangement of the vital functions of the body."

PREFACE.

My attention was first called to the subject of the Contagious Cholera, by the accounts of its early progress, which were transmitted from India to Europe. I have since had an opportunity, during a temporary residence in Bengal, the country where it originated, of observing the disease to a considerable extent, and of conducting the medical treatment of a number of patients. The results of this experience, and of information which I there obtained respecting the Cholera, are

submitted to the consideration of the profession in the following pages.

As the chief aim of Medicine is to discover a remedy for the ills of which it treats, I have made the curative process the object of my particular attention in the present work. This was rendered the more imperative, in this instance, in consequence of the advance of the disease to Western Europe, and the doubts which exist among medical men, who have not been in India, as to the proper method of cure. While speaking of the medical treatment best suited to cholera, I have restricted myself to the elucidation of what I conceive to be leading facts and principles, in order that the most important points of practice might be fully understood, and easily remembered. With this assistance, however, the professional reader will be enabled to select a great variety of detail information from other parts of the volume to be presently described.

The large majority of the facts contained

in this volume are taken from the Reports on Cholera, which were compiled in India by order of the East India Company. For the opportunity of laying them before the public, I am indebted to the liberality of the Honourable Court of Directors, which has ever shewn an earnest desire to promote the interests of science. In making abstracts from a part of these valuable reports, my object was of a general character, namely, to introduce short descriptions of cholera, and a variety of opinions from various authors—under the impression that a more comprehensive knowledge would be conveyed in this way of the peculiarities of the disease, than could possibly be afforded in the uniformity which usually pervades the description of an individual. In pursuance of this plan it became inconvenient to copy the original reports at full length, for in that case a few might have occupied the whole of their allotted space; in some instances, then, they

have been abridged to less than one-third of their original dimensions. The evident injustice which curtailment inflicts upon the merits of the authors, will, it is hoped, be extenuated by the urgent necessity of the times, when the lives of thousands may depend upon the diffusion of comprehensive medical instruction. While endeavouring to record, in brief space, the sentiments of gentlemen who have differed from, as well as of those who have partially coincided with, my opinions or practice, I trust that an occasional departure from the text may be found to consist, as intended, merely of verbal amount, and in no case to interfere with the sense of the passage.

To record an opinion of the relative value of the Indian documents might seem an uncalled for, and invidious act, but I cannot omit stating, that the talents of Mr. Scot, Secretary to the Medical Board of Madras, and the writer of their Report, claim pe-

culiar respect. Mr. Scot executed a very difficult task with judgment and impartiality.

That the contents of the volume may be accessible to the general reader few technicalities have been introduced, and, with a similar object, some pages of explanatory matter have been added, which will require the indulgence of the professional critic. It is right, however, to observe that I have no personal dislike to technicalities: the terms of common language are not at all times sufficiently restricted in their meaning for scientific use, and, occasionally, they cannot afford even a vague substitute for a technical expression. Medical technicalities may be used improperly, or multiplied to excess, but persons who raise an indiscriminate clamour against them, are either ignorant of the spirit of science, or actuated by sinister motives. Technicalities are here frequently dispensed with, because it is of the utmost importance that the public should know to

what extent the cure of cholera is practicable, and in how far it may depend upon their own exertions, and the exertions of the profession. If the public are not made aware of the danger of delay in this rapid disease, and reconciled to an effective system of treatment, few will be the number of the recoveries in the event of its arrival amongst us.

Two Maps are given, illustrative of the geographical progress* of cholera; and to render them the clearest and most correct hitherto published, neither time nor attention has been spared. The dates are intended to correspond with the commencement of the inroads of cholera at the different localities. In some instances, a double date is attached to shew when the disease was propagated in a particular direction, during

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* Berlin and Vienna will be found in the map of its progress in Europe. The invasion of these cities, however, is not recorded in the Narrative, as it was put to press before the intelligence arrived.

a repeated invasion. The first map is devoted to Hindostan; and it may be considered exceedingly accurate, as the dates were furnished to Government by the medical officers scattered over India. There is an apparent contradiction, however, between the authorities with regard to Nagpore. The Bengal Report says that the cholera commenced at Nagpore, in the last week of May; while the Madras Report assigns the 15th of May as the period of its origin. By my referring to the statement of the medical officer at the station, it appears the disease commenced among the native population on the 15th of May, and the troops escaped until about the 26th of the month. This explains the discrepancy. The Bengal Report was guided by the army returns; and the Madras followed the attack of the inhabitants.

The variety of Indian cholera under consideration has had several names assigned to it, as the "Epidemic Cholera," the "Spasmodic Cholera," the "Epidemic Spasmodic

Cholera," "Cholera Asphyxia," the "Malignant Cholera," &c. It matters little what name is bestowed upon a disease, provided the name leads to a knowledge of its identity; none of the preceding, however, seem sufficiently expressive for that purpose. In India, the *species* of cholera to which this variety belongs, had existed from the earliest ages, and, occasionally, had prevailed to a great extent, and in an exceedingly virulent form, even previous to the year 1817; during these periods some, or all of the above names might very well apply; but, in 1817, the disease assumed a contagious property, which there is no evidence to prove it ever before possessed; and a name was then wanting to distinguish the new variety. Writers, convinced of its propriety, have abstained from using the title, "Contagious Cholera," in deference to the opposition of the Non-contagionists. With every respect for the ability displayed in this opposition, I cannot pursue a similar course. My defence must rest on the facts adduced

towards the end of the volume in favour of contagion, and the common practice, in physical philosophy, of adopting the theory which best explains the phenomena. To avoid expressing an opinion, the appellation, "Malignant Cholera," will appear once or twice, not, of course, as characterizing the violence of the disease in individual cases, but the wide-spreading destruction which has peculiarly marked its progress.

Opinions of an abstract tendency, that might interfere with the practical utility of the volume, have been specially avoided. On this account, the primary origin of the Contagious Cholera in Bengal is attributed to the *obvious* circumstances under which it appeared. Speculations to ascertain the nature of the peculiar and essential change that the climate, soil, and constitution of the inhabitants, or that any of these underwent, could serve no useful purpose. Human knowledge is in this respect extremely limited; we know that one species of tree will bear apples,

another peaches, but we cannot tell *why* their fruits are different. The malignant cholera is indigenous in Bengal, and unknown in Lower Egypt—countries that have many properties in common. The proximate cause of cholera is also left unnoticed. It is, however, a more tangible subject than the former, and I shall probably take it up, with some other argumentative deductions, on a future occasion.

Since the body of the work went to press, the Board of Health, established by His Majesty's Government, has published a pamphlet, containing papers descriptive of the cholera in Russia. The symptoms of the disease, as there detailed, appear to correspond pretty accurately with those of the cholera in India; but the manner in which it is divided into stages does not agree with that adopted here, and it will therefore require a few observations to obviate confusion.

In the graphic report of Drs. Barry and Russell, the cholera is divided into two stages.

The first of these is called the *cold* stage; the second, the *hot* stage. In my arrangement, on the contrary, the *cold* period—or, as I call it, "acute cholera"—is *not* comprised in one stage: it is divided into two types, and several stages, for the purpose of medical treatment. To the hot, or fever-period—and, indeed, to all the morbid sequelæ of acute cholera—I would give the name of "chronic cholera."

Acute cholera, it appears, has been much more frequently followed by common febrile symptoms in Russia than in India; and these symptoms have been very severe. To account for this, we may suggest one of two suppositions—either that the disease has become more intractable in cold climates—or, that the early stages have not been treated as effectively in Russia as in India.

I have seen no detailed account of the practice pursued in Russia. In the circular of the Board of Health, the remedial mea-

sures are recommended on the strength of the reputation which they acquired in India. The Board has been very general in its advice, restricting itself almost uniformly to a catalogue of symptoms and remedies. In one or two instances, however, the Board has departed from this general reserve; and, as I conceive that it has here fallen into an error, I shall quote the objectionable passage. Speaking of the rapid form of acute cholera, the Board observes—"In cases of this severity, "the vomiting and purging characteristic of "the disease do not commonly take place so "early as in milder attacks, but seem to be "delayed until the almost-overpowered func- "tions of the body make a slight effort at re- "action. It is worthy of remark, that, unless "death takes place, in these extreme cases, "within a few hours, some effort of the animal "power is made to rally the constitution; and "this point is insisted upon here, because it "will direct the mind of practitioners to *the*

"*particular moment when bleeding*, and cer-
"tain other parts of practice, recommended in
"the Indian reports, can be enforced in this
"country with probable success."—Now, if this recommendation of the Board of Health should be observed in England, in case of the arrival of cholera, I cannot withhold the expression of my conviction (judging from the practice in India), that it will lead to the loss of numerous lives that might have been preserved under judicious treatment.* Here, blood-letting is advised to *wait* upon reaction; and, in the majority of violent cases thus treated, reaction will never occur. No—blood-letting should be performed the instant of the attack, or in as few minutes after as possible; and, if blood can be freely procured, the blood-

* The medical gentlemen composing the Board of Health are said to have never had practical experience of cholera; this statement, therefore, cannot affect their medical judgment in other matters.

letting will be the efficient remedy in *establishing* reaction. So great are the advantages of early blood-letting, carried to a greater or less extent, according to the age and constitution of the patient, and the severity of the symptoms, that, in every severe case of cholera seen by the practitioner at the commencement of the disease, it should be resorted to. A slight delay, even in the protracted type, may render this remedy unavailable. After the cramps are fully formed (as in the second division of the symptoms of the first stage, recorded at page 174), it will rarely happen that blood can be obtained in sufficient quantity to prove serviceable; and when it cannot be obtained in quantity, its *partial* abstraction seems often productive of an injurious effect. The public should be warned of the universality of blood-letting at the *onset*, and plain rules should be given for its popular use—as circumstances may occur in which the operation might have been per-

formed through the instrumentality of "bleeders," and others, before the arrival of the regular practitioner. *Dry* heat is a remedy that the public should always apply until such times as they can receive proper advice; but as the application of moist heat requires considerable medical judgment, it can scarcely ever be trusted out of professional control.

J. K.

Solly Terrace, Claremont Square,
October 8th, 1831.

THE HISTORY

OF THE

CONTAGIOUS CHOLERA.

SECTION I.

Early Impressions on Entering Bengal.—Climate, &c.—Origin of the Malignant Variety of Cholera, in the year 1817, ascribed to the Climatic Vicissitudes and Peculiarities of Bengal.—Propagation of the Disease through the Upper Provinces of Hindostan ascribed to Contagion.—Progress of the Contagious Cholera during the first twelve months of its Course.

The stranger who visits Bengal, alive to the "splendour of the East," discovers little to gratify his expectation, in the first approaches leading from the sea towards Calcutta. Weighing anchor at day-break, he leaves the treacherous "Sand Heads" behind him, and enters the estuary of the river Hooghly, a broad and deep branch of the mighty Ganges. To the right, lies Saugor Island, the nearest point of the coast. To the left, dimly emerging from the waters, lies Kedgeree. The sun is now gathering strength, and the malarious

vapours are seen coiling themselves up from the surface of the land, which presents the unbroken aspect of an endless swamp, covered with low, black, impenetrable jungle. As the "City of Palaces" is yet distant one hundred miles, there is ample room for improvement. The ship, under the favouring influence of wind and tide, flies at the rate of fourteen miles an hour,* and the eye is constantly greeted by new objects of wonder. The jungle is gradually giving way to shrubs of healthy stature and complexion. These, again, are obliged to yield to trees of subordinate dignity; while, another hour over, and the voyagers are introduced to the aristocracy of the woods. Groves of majestic timber, of varied shape and hue, line the banks, or cluster here and there, revealing in the interspaces the outwork of civilization, which, to a traveller weary of the sea, is the most delightful prospect in nature. The patient Ryots (Hindoo farmers) are slowly traversing their rice-fields. In the distance stands a native village; the conical huts, each constructed in the form of a hay-stack, give to the whole the strong resem-

* Every person is aware of the rapid manner in which the tide flows up the Ganges; but this description is meant to apply more particularly to the circumstances under which the author entered Bengal.

blance of an English farm-yard. The aspect of the country, however, shews no "pinnacle of hope," it is still a low, moist, interminable flat.

Having reached Diamond Harbour, scarcely five-and-thirty miles from Calcutta, the current of observation flows in a new channel. The pilot points to this as the place where thousands of our countrymen have been sacrificed to marsh fever. The Company's ships, in delivering their cargoes here, send ashore many a gallant tar never to return. The malignant cholera, also, soon after its ravages were begun, travelled through the shipping at the anchorage, and carried off many victims. These remarks, in passing, fill the heart of the stranger with a tide of mournful emotions, and evil anticipations,—his home, and the expectant faces of parents, brothers, and sisters, on the one hand; his own untimely death, and their unutterable sorrow, on the other.

New impressions quickly swallow up the old. Calcutta is in sight, and the villas of the English residents in the vicinity, sunning their Grecian faces in the planted lawns, seem to realize the visions of eastern pride and luxury. These mansions, built after the ancient architecture, and surrounded with luxuriant vegetation, have a highly picturesque appearance.

The impression which the English portion of Calcutta is calculated to make will be much diminished by a previous acquaintance with "Garden Reach," the line of sub-urban villas, which is necessarily passed in sailing up the river. The houses in the city are built in the same fashion as those in the Reach. They are in general spacious, and, for ornament or use, are plentifully furnished with pillars and verandahs. But in this part of the globe, Europeans have reared few objects of curiosity worthy of special remark. A walk through Government House, and Fort William, with an evening drive round the "Course," (an open park, which encircles the Fort,) comprehends nearly all the sights of which the modern capital of India can boast.

The excitement of novelty subsides in a few days, and the stranger discovers that a building with a splendid exterior can ill supply the absence of comfort within. His European tastes and habits are outraged by every thing, in the economy of an Indian dwelling. The huge apartments are uncarpeted, and scantily furnished, which, in addition to white-washed walls and ceilings, diffuse an air of desertedness around their unaccustomed inmate, who will not admit that coolness, and the partial exclusion of insects

and reptiles, compensate for the want of the domestic ornaments.

It might be expected that the effect of the ungratifying prospect within doors, would be forgotten in the beauty and advantages of the external world. Here, also, inexperience meets many disappointments. The fields, though abounding in the rarest productions of the vegetable kingdom, are not to be entered at all times with impunity. To wander with Nature carelessly, as of old, might lead to an attack of jungle-fever, or to a "sun-stroke." The sojourner in this unhealthy region discovers, sooner or later, that the source of his best enjoyment must ultimately repose on the hope of returning in independent circumstances to his native land; and that the surest way of attaining the object of his wishes is to make himself acquainted with the general character of the Indian soil and climate, in order to avoid, as far as possible, the physical causes of disease.

The surface of Bengal is wonderfully uniform, being throughout almost a perfect level. The dreary monotony is scarcely relieved by the rudiments of a solitary hill, though the length of the province has been estimated at 350 miles, and the average breadth at 300. The soil, in general, is

a rich alluvion, which, from the north-western boundaries of the province, is watered by the Ganges. The tributary branches, also, of that river, and their innumerable subsidiaries, intersect the country in every direction. During the rains no district is altogether destitute of internal navigation, and even in the dryest weather, there is scarcely any part distant a day's journey from a navigable stream. In most places, the natural inlets, or the artificial lakes and water-courses, admit of boats passing to the door of the peasant.

The wet surface of Bengal might lead to the supposition that springs of good water would be found at a moderate depth. But this is not corroborated by the following experiment:—In sinking a well, near the banks of the Hooghly, in the vicinity of Calcutta, the first appearance of damp was at the depth of 71 feet, and below 76 feet the soil was dry as near the surface. At the depth of 140 feet, which is nearly the level of the sea, no springs of fresh water could be detected.

As a proper supply of water is the great object of the Bengal farmer, numerous embankments are raised, to prevent its unequal distribution over the face of the country. In this way the rain is retained on extensive plains, which (on

account of their gentle declination towards the coast) would otherwise be completely parched, while the lower districts would be drowned in excess. For domestic purposes, as well as irrigation, a multitude of "tanks" (ponds) have been excavated, and surrounded with elevated banks, to collect and preserve the rain. These abound every where, and, apart from their utility, are productive of many evils. In the opinion of a rich, religious Native, one of the best acts he can perform is the formation of a tank: consequently, new reservoirs are multiplied beyond what necessity requires; while the old, as there is no spiritual reward to be expected for repairing them, are permitted to decay. They soon become overgrown with aquatic plants, and then form the cradle of noxious exhalations and disease.

In the southern parts of Bengal, the prevailing winds are North and South. The northerly and southerly winds blow alternately during unequal portions of the year, over that quarter of the province which approaches the ocean. The seasons conform nearly with those changes of the prevailing winds, and are usually distinguished by the terms Hot, Rainy, and Cold.

The HOT SEASON commences with the approach of March (the thermometer ranging between 73°

and 86°,) and the heat gradually increases to the latter end of May, when the weather has become exceedingly sultry and oppressive. The thermometer now fluctuates between 81° and 93°, in the shade, and the nights are calm, close, and suffocating. During the hot season, the wind blows steadily from the south, with the exception of an occasional storm, of short duration, from the north-west. These storms, called in India, "North-westers," are welcome visitors, as they serve to cool the burning air, and recruit the exhausted vigour of animal and vegetable life. The phenomena which precede and accompany a north wester are very remarkable. Towards the evening of the day on which the storm is to occur, the southerly wind, which had been previously continued and strong, dies gradually away into a dead calm. The clouds in the north-west part of the heavens have collected into a dense, lowering mass, like a mountain. Vivid lightning, and approaching thunder-peals announce the advent of the hurricane, and it bursts instantaneously, with full force, darkening the air with clouds of dust. Then follow torrents of rain; and in an hour or two the commotion is over, leaving the atmosphere cool and delightfully refreshing.

The RAINY SEASON sets in about the middle of

June, and with it, to the relief of the parched inhabitants, the atmospheric temperature declines. The wind coming round to the east, the frequent occurrence of thunder in the evening, and the constant cloudy state of the sky, are the heralds of the approaching change. The rainy season continues during the four succeeding months. In the first two months, the fall is generally incessant and heavy, an interval of a few days in succession being very unusual; but in the latter two, the intervals are considerable and often repeated. The rivers begin to swell with the setting-in of the rains, and in the third month the Ganges attains its highest point of elevation. By this time the low country is inundated throughout, and in the rice fields the ears of the grain may be seen floating on the surface of the deluge. The habitations of the peasantry, built on artificial mounds, are raised beyond the common ascent of the waters; yet, in visiting the fields or neighbouring markets in their boats, the farmers generally carry their families, and cattle with them, lest they should be submerged and drowned in their absence.

The COLD SEASON commences with November, and ends in February. It is the period of enjoyment

in India. The wind, now changed to the west and north, has rapidly swept away the dense masses of vapour that hitherto obscured the sky, leaving the atmosphere of a deep azure, without a cloud. The nights are also clear: the air feels cold, sharp, and bracing, and the decreasing temperature, by the middle of January, ranges as low as from 47° to 75° Fahrenheit. Even the cold season, however, has its peculiar evils. In the month of December, though the greater part of the day is clear, and the wind continues as before, towards evening a thin haze is observed to creep above the horizon, which, with the advance of night, is condensed into thick fogs. The fogs prevail during the remainder of the winter, rendering the mornings dark and disagreeable. No rain falls in the cold season; but vegetation thrives under the descent of copious dews. Throughout the year, the fluctuations of the barometer are exceedingly limited.

When the seasons observe the general course and period of succession just described, their influence on the constitution of the inhabitants is productive of several maladies which are considered in a great measure peculiar to these different divisions of the year. Thus the diseases chiefly dependent upon frequent transitions of

heat, cold, and moisture, as rheumatism, catarrh, intermittent fever, and diarrhœa, are the concomitants of the cold season. The scorching heats of summer are productive of bilious remittent fever, and this malady continues in the ascendant until August or September, when bilious dysentery becomes the prevailing distemper. Cholera and acute inflammation of the liver may occur in any month of the year; but they appear to be most frequent about the beginning of the rains.

In irregular seasons—and such will occasionally occur—the rains set in much earlier or later than is usual, forming what is called a *dry* or a *wet* year. Under these circumstances, the climatic affections are increased both in frequency and severity, and their characters will be determined by the nature of the atmospheric vicissitude. If the hot summer weather have been protracted, the enervated population suffer in an aggravated degree from the distempers common to hot seasons. If moisture prevail, the maladies of the rainy season may be anticipated in a more than ordinary abundance.

These are the evil effects succeeding *directly* to the influence of an irregular season; but there are others of still greater magnitude, which

spring *indirectly* from the same source. Irregular seasons, for instance, deteriorate the produce of the earth, and consequently the health of the inhabitants will be deteriorated by the use of the diseased grain, and the scarcity of food which necessarily follows a bad harvest. An extreme example of this was witnessed in the dreadful famine and its attendants which, about the year 1769, carried off three millions and upwards of the people of Bengal. The falls of rain had been unfrequent and of short duration, so that every plant was parched and unproductive. The grain crop was almost a total failure; and as the two former crops had been scanty, in their hour of extremity, the inhabitants had no resource. Rice soon attained ten times its usual price, and the miserable people were driven by the cravings of hunger to the woods, where they perished in thousands, after devouring the bark of trees and the remains of putrefying vegetables.

It is during the existence of these extraordinary calamities that mankind are most exposed to the inroads of pestilence. The scarcity and badness of the food, together with the deranged state of the atmosphere, conspire to debilitate and corrupt the animal system. Whole families,

in a state of utter destitution, ultimately become, through bodily weakness, unable to leave their beds or hovels, and there they lie surrounded by accumulating filth, until hunger or disease puts a period to their sufferings. It is not surprising to find, therefore, that many maladies, previously known only in a mild shape, should, in such a concentration of misery, become exceedingly virulent, or that some non-contagious distemper, occurring casually at the time, should suddenly assume a contagious form.

The majority of the severe contagious diseases which have from time to time afflicted Europe, were imported from the East. The small-pox was known for generations in China before it made its way to the West in the middle of the sixth century. For its origin, in the first instance, small-pox was most probably indebted to the crowded population of China, and the coincidence of famine, a distempered atmosphere, and, in short, to such circumstances as we have previously attempted to describe. In this way every age may be expected to modify the registered maladies, as it modifies the habits and genius of the inhabitants; and new diseases may be expected to arise, and old diseases to decline, as the natural consequence of

a change in the physical and moral condition of the people.

The close alliance existing between bad food, atmospheric vicissitudes, and the growth of contagious diseases, has been demonstrated in Bengal, even of late years. During the rainy season of 1815, the fall of rain was excessive, and what rendered it the more remarkable was, that the Ganges, the Soane, and the Coossee rivers burst their boundaries and destroyed much agricultural property in the neighbouring districts. The cold season that followed was damp, unpleasant, and exceedingly cumbered with dense fogs. On the other hand, the hot season of 1816 was distinguished for drought and intense heat. Few north-westers occurred to temper the air, and those that did occur, were accompanied with little or no rain. Towards the end of May, the thermometer had risen to 98° in the shade, a very uncommon height in Bengal; and under the effects of this extreme temperature many persons, European and Native, fell down dead in the streets.

The burning weather continued until interrupted, on the 14th June, by the commencement of the rains. During the remainder of June, and throughout July, the fall of rain was moderately free in Calcutta and its vicinity; but in the

month of August the showers became very scanty and rare, and the days and nights oppressively hot. In the western part of the province, the great drought that succeeded dried up the rivers, and apprehensions were entertained for the safety of the rice-crop. The 1st of September, notwithstanding, ushered in a most unexpected change. The unwonted drought suddenly yielded to a deluge of rain, which continued unabated through the month, and gave rise to a deeper and more extensive inundation than had happened at any period within the recollection of the oldest inhabitant.

It was now that the morbid effects of a long train of anomalous weather became evident among the people. In regular seasons, the prevailing diseases would have been of an inflammatory nature; but at this time the human constitution was too much enfeebled by an unwholesome atmosphere to support high inflammatory action. Diseases of debility, therefore, prevailed. The only cases, falling under the notice of medical men, were low fevers, and other disorders of the typhoid character. But the most remarkable feature in the period to which we refer, was the appearance of "Malignant Sore Throat," a contagious dis-

ease previously unknown,* unless by name, in this portion of the globe.

The year 1817 was marked with as singular deviations from the ordinary course of the seasons as those of the preceding year. Between these two annual periods a further resemblance is afforded in the fact, that while 1816 gave birth to the contagious disease called "Malignant Sore Throat;" in 1817 originated the Contagious Cholera, which has since ravaged the Asiatic continent and a large portion of Northern Europe.

February, 1817, instead of being dry and cold, like its general character as a part of winter, assumed the appearance of an autumnal month. It began to rain on the first day, and heavy showers were repeated every third or fourth day, to the beginning of March. During March, also, much rain fell, and, in addition, there was a constant alternation of cloudy and clear weather, the wind blowing with varied strength, steadily from the South. On the 21st a very violent thunderstorm was experienced, followed by hail and torrents of rain, which destroyed the blossoms of all the mangoe and other trees then in bloom, and

* Bengal Report.

severely injured the spring crops of grain and the new-sown indigo lands. The thermometer ranging from 68 to 82 degrees, the air felt cool and somewhat disagreeable to a person long resident in the country, but the inhabitants, European and Native, were in better than ordinary health. Among the former, chronic dysentery and rheumatism were the prevailing complaints. By the 30th of the month, however, an European soldier, belonging to his Majesty's 59th regiment, then stationed in garrison at Fort William, was attacked by cholera, and in spite of every remedy died in thirty-six hours.

At this time the cholera did not extend beyond the insulated case just noticed, and there was little to be remarked either in the weather or health of the population until the 25th of May, when the rains commenced, which was fifteen or twenty days earlier than usual. The rain poured down in streams, almost incessantly, during June and July. The season was now characterized as extremely wet, the river was quite full, and the country nearly under water. The clouded atmosphere generally felt cool and pleasant, but occasionally rather close and sultry. Thermometer 80 to 87 degrees. The existing diseases were still limited in extent; they had increased, how-

ever, in severity, and required active treatment. To fever, inflammation of the liver, and flux, acute rheumatism was now added.

The irregularity of the weather was not confined to the neighbourhood of Calcutta. In Jessore, Backergunge, Nuddeea, and every other part of the Gangetic Delta, the descent of heavy rain had been long and uninterrupted, and nearly the whole country, especially in the lower division of the province, was one sheet of water before the middle of August. Lakes and tanks, that in former seasons had remained nearly dry for a considerable time, were now filled to overflowing, and remained so for a comparatively long period. The measure of the rain that had descended was estimated at 120 inches, which is more by one third than the quantity common to Bengal.

This sketch of the seasons immediately preceding the origin of the Contagious Cholera, will qualify us to enter on the subject with stronger hopes of being able to remove the obscurity in which it has been involved. To the same end, however, the reader should bear in mind that cholera, in a comparatively mild and non-contagious form, had been known for centuries, during the hot and rainy seasons, in the several districts of Bengal to which we have alluded. The occur-

rence of these non-contagious cases, in 1817 and succeeding years, was often confounded with that of the malignant kind, a mistake which led medical men to make statements apparently the most contradictory, although in an enlarged view of the matter perfectly reconcileable.

It appears that during the month of August, 1817, a pretty severe type of cholera broke out among the natives of Bengal, at or about the same time in different parts of the country, and in places where there had been no immediate inter-communication. This shews to conviction that the state of the atmosphere, and the bodily condition of the native population in general, were circumstances sufficient of themselves to change the character of cholera; and that the virulent variety of the disease is not to be referred to any known or unknown cause, operating only in a particular locality of the province.

But when a malady originates in the way just described, its intensity is greatly modified by local circumstances. In a village supplied with running water, and surrounded by open grounds, which are favourable to free ventilation, the type will be less dangerous than in a town crowded with inhabitants, hemmed in by jungle, and exposed

to the exhalations of stagnant water. The type prevalent in the village, indeed, may be decidedly non-contagious, while that in the town—the disease being the same in kind, but different in degree—may assume the most virulent and contagious form.

Of the latter character, and distinguished by its intense malignity from all other varieties then prevalent, or previously known, was that form of Indian cholera which commenced its ravages in Jessore (a town distant sixty-two miles from Calcutta), during the month of August, 1817. Jessore is a crowded, dirty, ill-ventilated place, surrounded by a thick jungle, and exposed, during the rains, to the effluvia of an immense quantity of stagnant water. The district, of which it is the capital, in its southern quarter, is composed of the "Sunderbunds," a name given to numerous, low, marshy islands, contained in the Delta of the Ganges, and formed by the different channels through which that river travels to the ocean. The Sunderbunds are overgrown with wood, and inhabited only by tigers, reptiles, and such other denizens of the wilderness. The 28th of August, it was reported to the government that a malignant species of cholera had appeared in the populous town of Jessore, and that it was attacking all

classes of the natives indiscriminately, and cutting off from twenty to thirty persons daily. "The inhabitants," said the Report, "astonished and terrified at the unaccountable and very destructive inroads of the pestilence, are flying in crowds to the country, as the only means of escaping impending death. So unforeseen and unparalleled was the attack, that the functionaries, in extreme consternation, closed the Civil Courts of the District, and business of every description was abandoned for a time." Even at the beginning the disease seems to have exerted a very destructive power. In the short space of a few weeks 10,000 of the inhabitants perished in the single district of Jessore.

Many cases of cholera had occurred in Calcutta among the native population as early as the middle of August, but they appear to have been comparatively moderate, and of the non-contagious type. It was near the end of the month before the malignant disease began to spread, and the opinion obtained at the time that it had been imported from Jessore. That this opinion was unfounded some medical men have since endeavoured to shew. The question raised, however, is of little interest, for in Jessore and in Calcutta the condition of the people and of the atmosphere

must have been very similar; and the probability follows, that, sooner or later, a similar species of disease would have been generated in both, though no intercourse had existed between them.

The pestilence committed great havoc among the natives during the first days of September; but the Europeans were not attacked until the 5th of the month. Why the disease should reach the Europeans then, and not before, cannot be explained on any meteorological observation made at the time. The fluctuations of the barometer and thermometer were exceedingly small, and the other atmospheric phenomena were regular.

An official notification of the existence of the malignant cholera in Calcutta was forwarded the 15th September, from the chief magistrate of the city to the government. It stated, that "the disorder was raging with extreme violence, particularly in the poor and unhealthy districts of the town and suburbs." Here, truly, the scene was deplorable. To convey an idea of the complicated wretchedness of the lower classes of Hindoos and Mussulmans at this period, it will be necessary to speak of their habits and places of abode. The "City of Palaces" forms only one (the English) half of the city of Calcutta; the other is the native town, which contains, in con-

nection with the suburbs, at least 500,000 inhabitants. The Native town is chiefly composed of miserable lanes, narrow, dirty, and unpaved; and the majority of the dwellings are low huts, with side-walls built of mud, mats, and bamboos, and covered with small tiles. Amongst the swarming population of these filthy receptacles, in which all descriptions of disgusting animal and vegetable odours abound, the distemper ran a long and wide career of destruction. Barely existing on a meagre diet of bad rice, the poor workmen, who had been abroad all day pursuing their laborious avocations in the sun, returned to their hovels in the most fitting state of body to contract the disease. Exhausted by the heat and fatigue, and confined during the night with their families, often six or eight in number, in a small space to which fresh air was a stranger, they were attacked by cholera in hundreds; and a frightful proportion of those attacked were swept away in the lapse of a few hours. This was more especially the case in the lowest part of the town and suburbs; and in the adjacent villages of Kidderpore, Manicktolla, Entally, Chitpore, Sealdah, &c. The condition, indeed, of the inhabitants of the latter places is hardly to be imagined. These villages are made up of mud or straw huts, which

are individually from six to twelve feet square, and so huddled together that there is scarcely room to pass between. In each of these unhealthy habitations a whole family resides, and, not unfrequently, cows and other domestic animals are added to the proper inmates. These dependencies, moreover, are every where intersected by pools, broad ditches, and channels, which in the rainy season become the reservoirs of foul water and corrupt weeds.

Whilst the contagious cholera was raging in Jessore and Calcutta its ravages had been extending in every other direction. Before the end of September the pestilence had spread throughout, and beyond the province, from the eastern limits of Purneah, Dinagepore, and Silhet, to the extreme borders of Balasore and Cuttack; and from the mouths of the Ganges nearly to its confluence with the Jumna, a space measuring in length, and also in breadth, upwards of 400 miles. All places of note in the province of Bengal, sooner or later, in a greater or less degree, were subjected to its visitations. Even at this time few towns or villages in an area of several thousand miles, escaped the invasion. The cities of Dacca and Patna, the towns of Balasore, Burrishol, Burdwan, Rungpore, and Malda, suffered severely. Across the

whole extent of the Gangetic Delta, and especially in the tracts bordering the Hooghly and Jellinghy rivers, the mass of the population was sensibly diminished by the pestilence.

The scourge now spread from Bengal to the adjacent provinces, and with its geographical progress in this new sphere of action some peculiarities were developed which had not been previously observed. In Bengal the disease extended freely and rapidly in every direction, probably because the contagion had been generated in different localities about the same time, and its extension favoured by the uniform character of the soil, atmosphere, and inhabitants; but in the other provinces of Hindostan its effects were limited, at first, to particular lines and divisions of the country. Instead of spreading from Muzufferpore, Chupra, and Ghazipore, through the contiguous districts of Gorruckpore and Juanpore to the provinces of Oude and Rohilcund, it subsided in that part of the country, and infested the tracts lying west of the Ganges and Jumna. Thus, from the beginning of November, when it declined in Muzufferpore, and during the lapse of several succeeding months, not any district of the large sweep stretching to the east of these rivers, from the northern point of Saharunpore to the southern

boundary of Tirhoot, was visited by the distemper. During a subsequent inroad, however, these districts suffered severely for their previous immunity.

On the other hand, by pursuing a north-westerly course, the pestilence, at an early period, had penetrated along the Ganges, its navigable tributaries, and the high roads, into the interior of that part of the country. The appearance of the malady was announced the 6th of November, in the grand army then stationed in Bundlecund, a portion of the Allahabad province. This army had been assembled in anticipation of a war with the Pindarries, a predatory horde of native cavalry, and the centre division, consisting of 10,000 fighting men, and 80,000 camp-followers, was encamped on the banks of the Sinde, under the immediate command of the Marquis of Hastings. It was here that the cholera exhibited its most destructive power. Before or since there is not any instance upon record in which the comparative mortality has been so extensive. The first cases were observed amongst the lowest classes of the camp-followers, and excited little alarm; but increasing in virulence with the number of its victims, the disease soon spread to every description of people, and in every direction. Previous

to the 15th, it had extended throughout the camp, and, contrary to the usual disposition of the malady, equally attacked the males and the females, the young and the old, the weak and the robust. Europeans and Natives, fighting men and camp-followers, were alike selected, and as helplessly sank within its death-grasp. At this time, so concentrated was the contagious poison, that in resisting its effects, the only apparent advantage possessed by a strong over a weak constitution was the power of postponing the catastrophe for a few hours. The English soldier usually perished within six or twelve hours after the accession; the Sepoy within three or six. From the 15th to the 20th, the mortality had been enormous, and the stoutest hearts were beginning to despair of escape. It was a common occurrence for sentries to be suddenly seized at their posts, and having been carried in, to have two or three successors before the two hours' duty was performed. Latterly, the Hindoos being unable to convey the numerous bodies of their deceased relatives to the river for the purpose of the customary ritual, they were thrown promiscuously into the neighbouring ravines, or hastily committed to the earth in the places where they had expired. The camp wore the aspect of a general

hospital. The medical officers, night and day at their stations, were no longer able to administer to the crowds of sick that continued to arrive from every quarter. The scene formed a striking contrast to what it had been a few days before. The noise and bustle almost inseparable from the presence of a multitude of human beings, had nearly subsided into stillness. Nothing was to be seen in motion save a solitary individual here and there anxiously hurrying from one place to another to inquire after the fate of his companions. Nothing was to be heard but the groans of the dying, and the wailing for the dead. The natives perceiving the only hope of safety in flight, now deserted in great numbers. But the precaution frequently deceived them. The fields and highways for miles around were covered with the bodies of many who had carried with them the seeds of the distemper.

That the language employed in describing this melancholy picture is not adopted from any motive unworthy of science, or in the slightest degree an exaggeration, will be evinced in the authenticated account of the mortality which took place during a few days. In the five days included between the 15th and 20th of the month, the number of deaths, as published in the govern-

ment report, amounted to FIVE THOUSAND. Had the pestilence continued to spread and destroy after such a frightful manner, the camp would soon have been depopulated. But the Presiding Intelligence, who permits the growth of physical evil, to serve, doubtless, as an agent in the production of ultimate good, has also determined the limits of its increase. The cholera, which raged to an unparalleled extent on the 20th of November, was deprived, at the end of the three following days, of its infecting power. Few new cases occurred after the 23d, and those that did occur were of a mild and tractable nature. The camp was cumbered, however, with a multitude of sick; and the Marquis of Hastings, to facilitate their recovery, resolved on changing the site of his encampment. Accordingly, the division, with as little delay as possible, commenced its march in a south-easterly direction, and, after several intermediate halts, took up its position near the Betwah river, a distance of fifty miles from the Sinde.

It is impossible to calculate the change which the political fortunes of India might have undergone had the Pindarries taken advantage of the grand army while it was labouring under the pestilential scourge. The enemy numbered upwards

of thirty thousand horse; and, in addition, as the Marquis of Hastings soon had occasion to know, they had come to an understanding with Scindia, a powerful Mahratta chief. In delineating the rise and progress of the war, on his return to the Presidency, the Governor-General thus spoke of the visitation: "The dreadful pestilence, which made such havoc in the division under my immediate command, forced me to leave the banks of the Sinde, and to seek a more favourable country for the recovery of my numerous sick. I did not find this until I was fifty miles from the river which I had quitted. Fortunately, the change of air was rapidly beneficial; for a very short time had passed, when I received intelligence of an invitation said to have been given by Scindia to the Pindarries."

Distressing as was the spectacle presented by the army in camp, the line of march afforded a scene, if possible, still more affecting. Every means had been taken to furnish the sick with proper modes of conveyance: the ammunition-carts were resigned for their service; elephants and draught cattle were collected from every quarter—but, the accommodation falling short of the extraordinary demand, a considerable part was necessarily left behind to await the transmission

of their more fortunate comrades. Yet, eventually, it did not appear that the latter had much cause for gratulation. In their progressive movement, the grounds which they occupied during the night, as temporary encampments, were generally found, in the morning, strewed with the dead like a field of battle; and their daily route resembled that of an army retreating under every circumstance of discomfiture and distress. In the short period that elapsed between the 6th of November and the 8th of December—after which no fresh case of the malady was observed—of the 10,000 fighting men, 764 had fallen victims; and of the camp-followers, about 8,000 perished, or one-tenth of their whole number.

A superficial acquaintance with the progress of cholera, might lead to the supposition that its decline in the grand army was connected with the change of locality prescribed by the Commander-in-chief; but the history of the disease shews, on the contrary, that it had run through its course of infection *before* the army quitted the banks of the Sinde, and that the only benefit derived from the change of air was the assistance it afforded in the recovery of the multitude of people who were lingering under the effects of an old attack. To ascribe, indeed, the cessation of the pestilence to any

virtue in the soil or atmosphere of the encampment by the Betwah, would be little less than absurd; for the troops did not arrive there until the 19th of December, and a new case of cholera had not been observed during the eleven days which immediately preceded their arrival. If additional evidence were really necessary to settle this point, it would be amply furnished in *the law of increase and decline* appertaining to cholera, which we endeavoured to explain and illustrate in another place.* This law informs us that when the malady has been developed in a camp, it will continue its ravages through the period of one month, or so, independent of locality—whether the infected camp be removed from a moist to a dry district, or from a low to an elevated station—and, at the expiration of the monthly period, that the disease will die away spontaneously, and give little further trouble for a time.

Having decimated the grand army, and still extending along the track of the principal rivers and great roads, the cholera visited every considerable town and village of Bundlecund; it was afterwards communicated, in succession, to the provinces of Berar, Malwah, and Candeish, and

* Letter which appeared, June 23d, in the *Times* paper.

eventually to almost every portion of the Deccan.

From Saugur, a large town in the province of Malwah, the contagious current diverged in two directions. One branch pursued a south-westerly route. Having passed through several towns, and through Sir J. Malcolm's camp at Mhow, it entered Mahedpore the 12th of May, when, adhering as before to the neighbourhood of the Chumbul river, it successively attacked Sonara, and the camp of Holkar in the immediate vicinity. At length, in the month of June, the populous town of Kota, situated along the east side of the Chumbul, was invaded. Kota is built upon the solid rock; and here the banks of the river are rocky, and the channel deep and narrow. The mortality, notwithstanding, was very great. About one hundred persons died daily for some time, which struck the inhabitants with such dismay that they abandoned the city.

The second branch took a southerly course from Saugur, and, after attacking the Left Division of the army, and the Nerbuddah field force, it extended through the states of Nagpore and Poonah to the presidencies of Bombay and Madras. The troops under Major-General Marshall,

during their march to Mundelah, fell in with the disease at Jubbulpore, on the Nerbuddah river, and suffered from its effects during the remainder of the month. The mortality, however, among the regular troops bore no proportion to that recorded in the Returns of the Centre Division.

Following the channel of the Nerbuddah, the disease next reached Husseingabad, and, afterwards, departing from that place, proceeded southerly, through the town of Mooltay, to the city of Nagpore, where it arrived in the last week of May. Both of these places, and many of the intermediate villages, were severely scourged. Mootlay itself, though an inconsiderable town, lost above five hundred of its inhabitants.

The Nagpore Subsidiary Force under Colonel Adams, afforded a striking instance of the influence exercised by the contagion over a large body of men previously free of disease. In the beginning of May this division had been occupied in besieging the important fortress of Chandah. In the siege much fatigue was experienced, which, with constant exposure to the sun, produced a few casualties; but nothing like a marked tendency to sickness had appeared among the men. Return-

ing, however, some time after to Nagpore, the troops encamped, the morning of their last march, at a village distant nine miles from the city. Here the report had scarcely reached the encampment that the cholera was raging in the neighbourhood, when the troops themselves were attacked. As it usually happens, the early seizures were the most severe. Many individuals who were suddenly afflicted, while obtaining supplies of domestic necessaries in the vicinity, were brought in either expiring or altogether dead. Of seventy cases admitted during that night and the day following, about twenty died. The later instances of attack were equally numerous; but in these the corporeal exhaustion was less sudden, and the subsequent symptoms were also of diminished severity.

A retrospective glance must now be directed to the course described by the cholera in travelling from the junction of the Ganges and Jumna over the greater part of the Northern Provinces of Hindostan. In the end of March, 1818, the disease became developed in Allahabad, and, moving progressively through this town and district, it destroyed ten thousand of the people in the lapse of a few months. On the western bank of the Jumna, and among many of the towns in

the Doab,* its progress could be distinctly traced from place to place.

Keeping close to the banks, the pestilence ascended the Ganges, and entered Cawnpore the 8th of April. It equally attacked the city, the military cantonments, the civil station, and the adjoining villages. In May it reached Etawah, and from thence, without infecting many of the intervening places, it stretched across to Futteghur. Meerut and Agra were soon included in the contagious chain; and, by the 20th July, the malady was evinced in Delhi, where it remained nearly a month committing great havoc among the dense population of the imperial city. Neither between Agra and Delhi, nor during its route from the latter, did the contagion manifest itself in many of the intermediate towns and villages; and it is worthy of remark, that the majority of the places that escaped were situated in low, marshy grounds, and exposed to the effluvia of much animal and vegetable matter in a state of putrefaction.† The immunity enjoyed, therefore, could not be ascribed to a healthy location.

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* A name given to the tract of country which lies between the rivers Ganges and Jumna.

† Bengal Report.

From Delhi the disease would seem to have spread in a south-west direction to the principality of Jeypore, the capital of which it reached in the latter end of August. Here it was neither very general nor virulent, being almost confined to the most wretched class of the inhabitants. The whole mortality, including that of the circumjacent country, scarcely exceeded one thousand persons. The distemper began to abate in the city the 12th of September; but, during the 14th, it appeared in the camp of a detached force commanded by Major Agnew, at a place called Titirya, a distance of twenty-five miles from Jeypore. In the camp the cholera assumed a virulent character, and continued to extend until the 28th of the month, after which it gradually abated. Of 96 Europeans and 4,100 natives, composing the fighting men, the admissions were 292, of whom 122 died. Among the camp-followers, the casualties could not be correctly ascertained. The contagion appears to have been exhausted in this direction; for the present invasion did not extend to the town of Ajmeer, which is only eighty miles distant from Jeypore. The valley of Ajmeer also escaped; and its exemption is the more remarkable, as a large division of the Rajpootana troops were encamped in the valley at the time, on simi-

lar soil, and under external circumstances perfectly analogous to those of their less fortunate comrades at Titirya.

In April and May the Middle Provinces of Hindostan were invaded. It has been previously observed, that these parts of the country escaped when the cholera first appeared to the east of the Ganges; but now the contagion penetrated to every quarter, and carried off a vast number of the people. Its ravages were particularly severe in the city of Lucknow, the present capital of the kingdom of Oude, and in Fyzabad, the ancient capital. In the district of Gorruckpore, also, which had formerly escaped, the destruction of human life was very great: thirty thousand persons are said to have perished. At an early period the inhabitants deserted the town of Gorruckpore, and sought refuge from the pestilence in the adjoining groves and villages.

Short and rapid as is the preceding outline of the early progress of cholera, it may enable an attentive observer to suspect the existence of some of the laws and habits of the pestilence which have been since more fully developed. In travelling from one district to another, the marked predilection shewn in the choice of navigable rivers and great roads, as the medium of commu-

nication, might lead to the suspicion that the disease was contagious, and that it had been propagated through the crowds of people who frequent the lines of general intercourse. This would be further supported by knowing that the disease, though chiefly dependent for its origin, in the first instance, to the climate, soil, &c. of Bengal, had afterwards extended to the other provinces of Hindostan, where the climate and soil were of a different character, and where it had prevailed independent of the weather—its attacks being equally fatal and extensive in the months of winter and summer, and in their subdivisions, whether cold, hot, or rainy. We shall now proceed to lay before the reader a variety of abstracts, chiefly taken from the numerous Reports furnished by the medical men in India to the Government during the prevalence of the cholera in the presidencies of Bombay and Madras. These authenticated documents will materially serve to elucidate both the laws which govern the distemper, and the method of cure, to be founded on the dictates of experience and reason.

SECTION II.

Abstracts* taken from the Medical Reports published in India, by order of the Government.

Abstract No. 1.† The 6th of August, 1818, the Malignant Cholera broke out at Panwell, a considerable village situated in the main line of intercourse between Poonah and Bombay. Panwell is distant from Bombay about fifteen or twenty miles, and is separated from the latter by an arm of the sea. Between these two places the communication is freely maintained, through the medium of boats. During the 9th or the 10th of August (as appears in Dr. Taylor's report) the first case of cholera occurred in Bombay, and it could be traced to a man who had arrived that

* In making these abstracts, the language of the originals has been retained, in justice to their authors, as far as was consistent with condensation and clearness.

† From the Preface to the Report of the Bombay Medical Board.

day from Panwell. It is also evident, from Mr. Jukes' report, that it spread North and South along the sea-coast from the same place, and that it was imported to a village in the neighbourhood of Tannah, in the island of Salsette, with a detachment of troops that escorted a state prisoner from Panwell to that garrison. In the town of Mahim, at the extremity of the island, and which is distant only five or six miles from the principal native town of Bombay, the disease did not break out until it was first established in the latter. It then gradually spread over the western side of Salsette, through which the road lies from Bombay to Surat and the northern countries, and by which, during the S. W. monsoon, is the chief line of communication. Aware of the danger of the malady, and with the humane view of relieving the sufferings which it inevitably produced, some individuals carefully watched its progress. Assisted by their observations, we are enabled to trace the disease as if creeping along from village to village over the island of Salsette precisely in the same way,—that is, by the arrival of people affected with the disease from places where it was known to prevail. And we are assured that some of the villages on that island, in the absence of this sort of communication, or from some other

cause, have, after a lapse of four months, hitherto, entirely escaped.

From the foregoing detail, we are disposed to conclude that this epidemic is not only different in its nature from those that have been hitherto observed, but that it may be said to stand alone in regard to some of the more essential characters which usually distinguish such diseases. It appears to us, however, that the cause of cholera is capable of being transported from one place to another, as in cases of ordinary contagion and infection, and that it has also the power of propagating itself by the same means that acknowledged contagions are accustomed to do.

In October last, when the disease had almost disappeared at Tannah, the attention of Mr. Jukes was called to a case that had appeared in one of the apartments, in the barracks of that Fort, appropriated to the European troops. Owing to the late application for medical aid, this case terminated fatally. Another case occurred a few hours afterwards, the subject of which was saved with much difficulty and danger. In the course of six succeeding days, no less than nine cases occurred in the same apartment. The curiosity of Mr. Jukes was naturally excited to ascertain under what circumstances so much disease was

produced, and, on examination, the ward appeared to be both badly ventilated and too much crowded with men. The place was immediately emptied, scoured, and fumigated, after which no other case happened among the inmates.

After the middle of December, when we had flattered ourselves that the cholera was diminishing as the cold season advanced, the number of patients considerably increased in this island (Bombay), and in Salsette, and the Conkan, which consequently excited much alarm. In some instances these cases have been confined to particular spots, and sometimes to particular houses, where the disease has attacked, in succession, whole families, consisting of three, four, or five persons; while in others, only a single case, or at most, very few have occurred. The first attacks invariably proceed to a fatal termination, when not opposed by the use of medicine. Poverty, dirt, &c., powerfully predispose the mass of the population to the reception of the disease; and, though not necessary to its production, they prepare a more unlimited range for the operation of the original cause, whatever that may be. Sad experience, however, has shewn that the absence of the common predisposing circumstances affords no security against the attack; but it appears that

a smaller proportion of the higher orders of society has suffered on this side of India than in the Bengal presidency. In Bombay, the disease has been nearly restricted to that class of the population which is most exposed to the severest labour and privation. These people, occupied in obtaining a daily subsistence, feel little inconvenience while the excitement of labour and exercise remains; but the moment the excitement subsides, they are peculiarly exposed to the inroads of the contagion: hence it has been observed that the attacks are most frequent during the night.

No. 2.* Neither the strong contrary monsoon winds, then prevailing, nor the insular situation of Bombay itself, appear to have had any influence in exempting it from the attack of the cholera; which, advancing from the eastward, made its appearance on the island about the middle of August, and spread with rapidity from one end of the island to the other. The disease seems to have attained its height about the end of that month, or the beginning of September, when three

* George Ogilvy, Surgeon, to the President of the Medical Board, Bombay.

or four hundred cases were occurring daily. Soon afterwards it began to decline; at first rapidly, and subsequently in a varying though much diminished degree.

The malady has been chiefly confined to the natives. Very few Europeans were attacked; and, of these, the highest orders seem to have almost entirely escaped. I have, however, observed that the Parsees, who approach nearer to Europeans in constitution and habits of life than many of the other classes of natives, have suffered considerably. In the Fort many were seized, and the disease was sometimes extremely rapid and formidable.

As the first symptoms of the cholera are frequently slight, it has been remarked that many medicines may have had the credit of curing cases of the disease, which might have proved to be merely attacks of cholic, or any thing else; and that the opinion formed of the remedies had been, in consequence, too favourable. That this occurred, now and then, is not improbable; but, in so far as my observations go, it certainly did not happen to any extent. In some instances, where I had an opportunity of watching the patients, I delayed giving medicines as long as could be possibly ventured with safety, for the purpose of

ascertaining whether they were actually cases of this complaint in its early stages, or otherwise, and in almost every one of these I was compelled to have recourse to vigorous measures in the end. The success which has attended the remedial means adopted here, and the small proportion of deaths that have occurred, when compared with the thousands attacked, are, I think, chiefly to be attributed to the great alarm which the disease excited on its first appearance in the island, and the consequent promptitude with which the natives applied at the numerous stations for assistance, every thing depending on the early administration of the remedies.

An example of the insidious manner in which this disease not unfrequently commences, occurred in a servant of my own. While I was absent, on a short visit, he had been twice slightly purged, and, on my return, he complained of a trifling uneasiness in his bowels. He looked dark round the eyes, and his pulse was somewhat small, but had the cholera not been prevalent, it is doubtful if I should have thought any thing of the symptoms. It was now about ten o'clock, a. m.; I gave, as soon as the medicine could be procured, twenty grains of calomel, together with a dose of the mixture, which is kept ready prepared at the

different stations, containing a drachm of laudanum, with some brandy and peppermint. These were retained in the stomach, but they did not entirely check the symptoms. There was occasional sickness, and pain in the region of the stomach. A small dose was administered about twelve o'clock, and fomentations ordered. He was allowed to remain in his own hut, and appeared to be doing well until the approach of evening, when some fluid which he had incautiously taken brought back the symptoms in a most aggravated shape. I found him, at eleven o'clock at night, lying exhausted in his cot, with the most violent retching and purging recurring incessantly: he was bathed in profuse cold perspirations, his pulse was almost gone, his countenance shrunk and ghastly; burning heat and pain were complained of at the stomach, and cramps and twitchings in all his limbs. I gave him, immediately, four grains of the extract of opium soaked in the oil of peppermint, which he fortunately retained, and I had him instantly conveyed to the hospital. The hot-bath was ordered; and, while getting ready, an enema containing half an ounce of laudanum was exhibited: he remained in the bath, which was as hot as could be borne, for a quarter of an hour, when he became languid

and sleepy. He was then well dried and placed between warmed blankets. He soon fell asleep, and a gentle and warm moisture broke out almost immediately afterwards; orders were given that he should not be disturbed by unnecessary interference: in a few hours he awoke free of all immediate danger. During the whole of the attack, there was no appearance of bile in the evacuations, and some days elapsed before the biliary secretion was perfectly restored. For this purpose, and to hasten convalescence, it was necessary to give him small doses of calomel occasionally, and common purgatives, which, with cordials, light nourishing diet, and a small proportion of wine, brought him gradually round. His wife, who was in a bad state of health at the time, attended him during his illness. She was attacked with cholera about three weeks afterwards, and died of the disease.

I have seen the medicines given in double doses by mistake. An instance occurred to myself in treating a Sepoy who was reported to have fallen down in a kind of fit. I found him recovering from a state of insensibility, and complaining of a most excruciating pain at the stomach, with sickness, giddiness, and slight spasms or twitchings in the calves of the legs and in the

arms. His countenance was shrunk, and his pulse small; so no time was to be lost. The usual medicines, to be found in almost every house, were administered. He was then conveyed to the hospital, with orders that the warm bath should be prepared, but that no treatment should be carried into effect before my arrival. I followed immediately afterwards, with the intention of placing him in the bath and bleeding him. The note of instructions, however, sent with him, had miscarried, and I found, at the hospital, that the dose of medicine had been repeated the instant of his admission. This patient had taken, therefore, forty grains of calomel and upwards of a hundred drops of laudanum in less than half an hour: he was now inclined to sleep. I ordered that nothing should be done to interfere with his slumbers; and, in three or four hours he was as well as ever he had been in his life. The medicine seemed to have had no other effect than that of arresting the symptoms, which were making rapid strides.

Although vomiting and purging are generally among the first evident symptoms of this disease, yet I have never found them to prove the most formidable; one or other is not unfrequently absent, sometimes both, and they usually yield to

medicine without any great difficulty, even in cases which ultimately prove fatal. The name "cholera," which the disease has received in reference to these symptoms, would convey a very erroneous idea of it.

Pains, or burning heat at the stomach, and spasms, in some degree or other, have been rarely, if ever, entirely absent in the cases which have fallen under my observation. In some, the spasms have been so extremely violent as to render it requisite to have the patient held down. In others, and much more generally, the cramps were confined to the limbs, and less severe; very often, indeed, amounting only to a kind of gnawing or creeping sensation. In a great majority of these cases, the head has not been materially affected. The patients have frequently retained their senses to the last, answering questions rationally within a few minutes of death. In a few instances, however, the stupor has been very great.

Notwithstanding that the disease is much more under the control of medicine when the symptoms commence with slight purging or vomiting, and follow each other in gradual succession, yet it does not appear to me to be less certainly fatal, under these circumstances, *if left to itself*, than when the patient is attacked suddenly with giddi-

ness, coldness, loss of pulse, and all the most formidable symptoms.

Excruciating pain, or burning sensation at the stomach, severe spasms, or an affection of the head, seem to indicate the immediate use of the lancet; and, in these cases, I have had recourse to venesection without delay, and generally with the most decided advantage. When, in addition to the spasms, there is some heat of skin and quickness of pulse (symptoms I have occasionally met with in the commencement of the disease) it has appeared preferable not to use the bath so hot as in the later stages, when the stronger stimulants are required. A moderate warmth at this period seems to relax the surface better, and it proves more soothing. If there is much determination of blood to the head, I am cautious in pushing the laudanum, and, indeed, in all cases where the symptoms are inclined to give way, I discontinue its use as soon as possible. Other measures then become requisite, but, under the limitation mentioned, the opiates carefully prescribed have proved invaluable.

Not unfrequently, the mouth becomes affected by the calomel which is given within the first few hours, and in such cases, the secretions afterwards come round more speedily to their natural state;

but I never prescribed calomel, in the first instance, with the intention of causing salivation, for the patient is generally either dead, or out of danger, before the medicine could produce this effect. The natives, also, having a strong prejudice against mercury, it becomes advisable to obviate its salivary effect as much as possible, lest these patients should be deterred from seeking relief.

Examination after death shews, that in cases of cholera there is a great accumulation of blood in the large vessels, and internal parts of the body. Apparently, they are gorged and oppressed by the sanguineous fluid, and, every measure tending to restore the equilibrium of the circulation, one would naturally suppose must be useful. Blood-letting appears to have this tendency, by removing part of the oppressing liquid, and drawing the remainder into circulation. Advantageous results may possibly be anticipated from blood-letting, on other principles, but I shall not attempt to theorise.

In severe cases, there is often much oppression at the chest, with great restlessness and anguish, and these not uncommonly prove most distressing symptoms. By far the most formidable symptom, however, in this extraordinary disease, both in ap-

pearance and in reality, is the remarkable coldness of the skin, depending on the diminished energy of the circulation, which seems almost entirely to desert the surface. Many in this state eventually recover, by an assiduous and unremitting perseverance in the measures already described; but it frequently happens that every thing we can do is alike unavailing. The case is truly desperate.

I have tried blood-letting repeatedly, in this stage of the disease. It has very often happened that I could not get the blood to flow by any means whatever, and even if the desired effect were obtained, it has generally failed, as well as all other remedies, in doing any good. Yet it should be observed that I have treated several cases in which advantage was derived from blood-letting, under the most discouraging appearances; and I am not aware that I have seen it injurious.

It is chiefly, however, in the early period of this disease, to meet the urgency of particular symptoms, as previously mentioned, that I have resorted to blood-letting, and then with the most unequivocal success. But, with respect to natives, generally speaking, bleeding is not required, and the other remedies, when administered in time, overcome the disease.

Unless in some few instances which prove very

suddenly fatal, or in those cases where the remedies, had recourse to early, have arrested the symptoms, I have always found the remarkable coldness of the surface, and partial suspension of the circulation, ensue sooner or later. I am induced to consider them the most prominent features of this truly singular malady. Indeed their presence may generally be recognised from the very commencement, and their progress is at times exceedingly rapid.

I have seen several cases in which, after the violent symptoms were subdued, the patient has continued in a low inactive state, with a distinct though contracted pulse, and death-like coldness of the skin, the eyes yellow, and the countenance pallid. One patient died suddenly in this way, on the third or fourth day after he had got over the violence of the attack. My attention, therefore, was particularly directed to its recurrence. It has been always removed by calomel, in large or small doses, according to circumstances, followed up by purgatives, mild cordials, and light, nourishing diet.

In two or three patients I have observed very extraordinary convulsive motions of the extremities and head recurring at short intervals. In two females these vibrations were very remarkable in the muscles of the belly, and seemed to depend

on the augmented irritation arising from worms. They were both Parsees. In one of them the pain and the burning heat of the stomach were so excessive as to induce me to bleed her twice, though of a weakly habit. The calomel, followed by jalap and castor oil, produced immediate relief, and also destroyed the worms. Among the natives such creatures are very common, and have no connection with the disease of cholera in particular, further than by aggravating, or modifying some of its symptoms. It is no unusual occurrence for the powerful medicines, which are administered in the cure of the latter, or even the violent symptoms themselves, to destroy great numbers of these intestinal parasites.

I have seldom used blisters in the treatment of cholera, unless that the head has been particularly affected, and the patient in a state of stupor, or to remove local symptoms consequent to the disease. When the patient was seen, at the commencement, I have found the common remedies prove very generally successful; and in the latter stages, when the pulse is gone, and the patient cold, I have been induced to rely more on the hot-bath, stimulants, frictions, and other remedies of a general nature. The sooner medicine is had recourse to in this disease, the greater is the

chance of recovery. Its awfully rapid progress admits of no delay. The general remedial means, then, are: blood-letting, calomel, opiates, the warm-bath, friction, and the external application of heat, in all its various forms, blisters, ether, hartshorn, brandy, and other powerful stimuli, purgatives, &c. The whole of these may become requisite in the different stages of one individual case; but all of them are not always necessary, and some of them are, no doubt, at times, decidedly injurious. Each remedy is to a certain extent useful, and much may depend on their judicious selection and combination, in the management of various cases.

The continuance of this epidemic through all the seasons of India, and the extraordinary manner in which it seems to travel, have occasioned different opinions with regard to its being contagious, or otherwise. So much doubt, indeed, exists on this point, that it may be presumption in me to offer an opinion. Of the two native corps now here, and of which I held a temporary charge, during the indisposition of the medical officer attached, the cholera was much more prevalent in one than in the other, and in a much more aggravated form. From this circumstance I can draw no positive inference that implies con-

tagion. The former is a newly raised corps, consisting chiefly of recruits, who have been more drilled, and who possess fewer comforts than the old sepoys. Many of the newly raised men, also, were deficient in clothing, and consequently were unable to change their dress when they happened to be exposed to rain in the time of parade. That the corps in question was more predisposed to disease from some particular cause or other, (the local situation of both being the same,) is very evident, in the greater number of cases of severe bilious remittent fever that occurred in it. None of the hospital attendants were attacked with the cholera, though they were assisting the patients, day and night. Hammauls, it has been observed, have suffered more here than many of the other castes. So have fishermen. It has been, I think justly, remarked, that fatigue, poor diet, bad clothing, and exposure to cold and moisture, particularly predispose to the disease.

No. 3.* The first case of cholera was in a woman. She had been taken ill after sunset, the preceding evening, with vomiting of a whitish

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* Dr. Taylor, to the President of the Bombay Medical Board, 16 Nov. 1818.

watery fluid, accompanied with severe pain at the pit of the stomach and general cramps. When I saw her, the evacuations had ceased for about two hours. She complained only of what she termed knots in the muscles of the legs, arms, and belly, and of pain at the pit of the stomach, which, however, was less violent than at the commencement of the attack. There was great prostration of strength, and the pulse at the wrist and temples was imperceptible. Her mouth felt excessively parched; her tongue was foul, and the desire to drink cold water was very urgent. Her limbs were quite cold, and her countenance had a deadly appearance. During the night, some ginger and opium mixed with honey had been administered, and frictions, with warm spirits, had been applied, which diminished the spasmodic pains. I gave her twenty grains of calomel and eighty drops of laudanum, and directed fomentations to be used; but she died in an hour and a half after I saw her.

Aware of the desire manifested by your Board to ascertain, if possible, the manner in which the disease had originated in Bombay, I directed some inquiries on the subject. In reply, I was informed that, four or five days before, an inhabitant of Gunesa Wara, immediately on returning from

a visit to Poonah, (the disease at this time raging at Panwell,) had been attacked with cholera, and died; that on the day following, his wife, and the wife of a man who lived next door had also been seized with the same complaint, of which both eventually died; and that almost immediately afterwards, two other neighbours, an old woman and her grand-daughter, had fallen victims.

In the lane where these cases had occurred, the disease continued to spread during the five or six days following my first visit, after which it nearly subsided, and appeared only occasionally in one or two individuals. Seven other cases were observed on the 16th, in different parts of the native town; but the next fatal case which came to my knowledge happened on the 17th. The man had been taken ill during the night, and in the morning one of my assistants had been sent for. It was too late to perform any medical service: the patient died in five minutes after the assistant's arrival. This occurred in a pretty populous place above the jail. Soon after the preceding misfortune, a considerable number of people residing in the neighbourhood were attacked, and two or three of them, who did not resort to the use of medicine, were carried off.

Still, however, the reported cases were not numerous, only twenty-six were returned on the 18th of the month, and on the 19th twenty-two. But this may have arisen in the limited number of my assistants, who were employed in visiting different parts of the town; and, as they consisted of three or four persons, were insufficient for the duty. When, under your orders, I obtained a large establishment of assistants, the number of reported cases amounted to no less than 109.

The progress of the disease during the next six days was extremely rapid. On the 25th, the cases seen by my assistants were 318, and on the 26th, 293. From this time, however, you will perceive that the malady began to abate almost as rapidly as it had commenced. On the 1st of September, the patients in my reports were 137 in number; on the 15th, 97; on the 1st of October, 75, and on the 15th, 55. It continued decreasing till the 8th of November, when the cases reported were only 16. After this period the cases slightly increased again, and for the last few days they have fluctuated between twenty and thirty. A day or two of hard rain seemed to augment, in a small degree, the number of cases; but in other respects I have not perceived that the disorder has been much influenced by the state of the weather.

From the name, "Cholera Morbus," which has been given to this disease, we should have supposed that vomiting and purging, and especially of bile, were the invariable and most distressing symptoms. In a number of cases, however, there was neither vomiting nor purging, while in others one only of these symptoms was present; but in none was there the slightest appearance of bile. The spasms which, with a very few exceptions, were a constant feature of this disease, became in some instances so violent as to produce the utmost distress and agony. The patients were often seen tossing themselves forcibly in every direction, and calling out to the bystanders to lay hold of their limbs, or to sit down upon them. In one case the patient screamed out in dreadful torture, that his legs and arms were breaking. Locked-jaw occurred in several instances; while others complained of a sensation as if their bodies were pricked with pins.

Three different forms of the disorder have been noticed by accurate observers, and, I think, with judgment. In the first form the patient is attacked with slight pain in the bowels, which gradually increases, and is followed by vomiting,

purging, and spasms. After these, coldness of the limbs, loss of pulse, and clammy sweat gradually supervene. Under the first form of the malady, many cases were witnessed where the patients, having allowed six, eight, or even ten hours to elapse without applying for medical aid, ultimately recovered by means of calomel and laudanum, with stimulants and fomentations; but the remedial measures should never be postponed, as the chances of recovery are much diminished by delay. The following case will furnish an example of the danger.

A stout, healthy lad, of about fifteen or sixteen years of age, came to me complaining of a slight uneasiness in the bowels, which he said did not amount to pain, and he requested that medicine should be given to him. Supposing it to be merely one of those trifling affections which are daily met with among the natives, especially at this season of the year, I only gave him six grains of calomel, leaving, at the same time, particular instructions that, in the event of his becoming worse, I should be sent for immediately. His complaint increased in the afternoon and evening; but, unfortunately, the person to whom my orders were directed, instead of calling me in, rested

satisfied with giving him six grains more of calomel. At ten o'clock next day, when I went to see the other patients, the lad was dead.

In the *second* form of the disease, pain in the bowels, vomiting and purging, are rapidly succeeded by great prostration of strength, extreme coldness in the limbs, and loss of pulse at the wrist and temples. The eyes are yellow, fixed, and sunk; the face and breasts are covered with a cold, clammy perspiration: the patient frequently lies in a state of stupor, and when roused, usually makes no complaint, except perhaps of spasms in the extremities, and of a feeling that he is about to expire. These symptoms often occur within an hour or an hour and a half after the first inroad of the disease. Almost all such cases which came under my observation, proved fatal. The calomel and the large doses of laudanum, combined with the most powerful stimuli, produced no sensible effect; and when a vein or the temporal artery was opened, the blood either refused to flow at all, or only trickled down slowly in drops. In these cases I seldom had an opportunity of trying the warm bath; but in one instance, where it was used, it seemed totally to fail in rousing the powers of the system, or in relieving the symptoms.

Four or five cases of the *second* form occurred at my house. I shall only notice two of them. The first was that of a Kamati girl about eleven or twelve years of age. She was brought to me about six o'clock in the morning, and was said to have been taken ill about three hours before. Her limbs were perfectly cold, the pulse was imperceptible, and her eyes were sunk in their orbits. As no blood could be obtained, I gave her some calomel with a laudanum and stimulant draught. By these means she was for a time somewhat relieved; but she soon relapsed into a worse state. The warm bath was then used, and stimulant draughts were repeated at short intervals, yet without avail. She expired in three or four hours after I saw her.

The second case was that of a Fakeer, who, while attending a religious festival held by his caste, to avert the direful attacks of the *juree muree*, or fatal disease, was suddenly seized with severe pain in the bowels, which was immediately followed by slight vomiting and purging. When brought to me, an hour and a half afterwards, he had most severe spasms; his eyes were yellow and sunk, his extremities cold, pulse gone, and the skin covered with cold perspiration. Veins were opened in both arms, but scarcely any blood

flowed. Calomel and laudanum were then administered, and followed by stimulant draughts, fomentations, and bottles of warm water to his limbs and body. No relief, however, was obtained. He rapidly sunk, and died in the course of three hours from the time of his being brought to my house. I had not an opportunity of using the warm bath.

In the *third* form of the disease the patient falls down suddenly deprived of sense. The pulse is often feeble and indistinct; but sometimes rather full and strong. When he recovers a little he complains of great pain in the head, and giddiness, and frequently of pain in the bowels. In three instances of these attacks locked-jaw existed.

Of the *third* form one case will be sufficient to notice. A woman who lived close to the bazaar went out, about seven o'clock in the morning, to purchase some articles; while in the bazaar she fell down senseless, and in that state was carried to her home. One of my assistants was immediately sent for, and at his arrival he gave her an ounce of the common mixture. Alarmed, however, at this appearance of the disease, he instantly came to inform me of the circumstances. When I saw the patient she had recovered a little from the state of insensibility, and her pulse was good, but she had

a considerable degree of locked-jaw. I bled her to the extent of twenty-four ounces and upwards; and as she complained before of pain in the bowels, I ordered her twenty grains of calomel, and, in the event of its being necessary, she was also to have a dose of castor oil. These measures were attended with good effects, and she speedily recovered.

These different forms of the disease are not to be regarded as distinct species, but merely as varieties produced by the same cause operating in peculiar constitutions, and in persons of diversified habits and situations in life. The practice in all these reports I have seen was conducted in hospitals under the immediate eye of the surgeon, who had proper native assistants under him. I was amply provided with every convenience, for employing with promptitude the various remedies required. It was soon ascertained, however, that the circumstances under which relief could be afforded to the immense population of this island, were very different. In scarcely any instance would the prejudice of the natives allow them to receive medical assistance in hospitals, or places where numbers could be attended together. As the only course then left was to administer medicines at their own houses, the board was compelled

to employ a numerous establishment of native assistants, and, in the pressing urgency of the occasion, many were necessarily engaged who had not the slightest knowledge of medical practice. For their information and guidance a general description of the disease, and of the method of cure to be observed, were translated into the Hindoostanee, Maharatta, and Guzerattee languages, and each of them was furnished with a copy of these instructions in the language which he best understood.

The method of cure which, after consulting with you, I ordered the native assistants to follow, was extremely simple. They were supplied with doses of calomel, each containing twenty grains, and a mixture composed of forty drops of laudanum, twenty drops of the essence of peppermint, three drachms of brandy, and four drachms of water. The calomel was first given in powder, which was laid on the tongue, and then washed down with an ounce of the mixture. A similar dose was to be repeated in two or three hours, if the patient derived no material relief from the former; or to be repeated immediately, should the first be thrown up—a circumstance, however, that very seldom happened. In addition to these medicines the assistants were ordered, in all forms of the disease,

where it was practicable, to use the warm bath; and when this could not be done, as was generally the case, to endeavour to alleviate the cramps and pain in the bowels by fomentations with cloth wrung out of warm water, or by the application of warm bricks or tiles wrapped up in cloth. When the more violent symptoms were removed through the use of these remedies, and only some pain, perhaps, or uneasiness remained in the bowels, an ounce of castor oil was exhibited. The patient received particular injunctions not to drink cold water, but to moderate his urgent thirst by the sparing use of warm rice-water. The assistants also were strictly enjoined not to suffer any one to be disturbed who felt a disposition to sleep.

The majority of the people suffering from cholera were treated solely by the native assistants, and, considering every circumstance, the success attending their practice has been much greater than could have been expected. A similar mode of cure was adopted by myself, with the exception that I had usually recourse to bleeding in the first place. I was called to see a person who had been ill *eighteen hours*, and who had received from one of the assistants two doses of calomel and two laudanum draughts. At the time I saw him, though his mouth was affected, he had excruciat-

ing pain in the bowels with distressing thirst and cramps. With some difficulty I prevailed on him to submit to bleeding. I took from him twenty-four ounces at least, and during the time the pain in the bowels entirely ceased. It was a little singular that on his arm being tied up he lay down on his left side, which the people of the house said he had not been able to do before. He did not complain, however, of any uneasiness in the liver. As slight spasms still continued I ordered him the warm bath. By these means, and the exhibition afterwards of castor oil, he perfectly recovered.

The next patient whom I attempted to bleed had taken calomel and laudanum, which stopped the vomiting; but when I saw him he had dreadful spasms, and was completely cold, and no pulsation could be felt at the wrist or temples. I opened veins in both arms, but not more than two or three ounces of blood flowed. Circumstances rendered it impossible to use the warm bath. He died in a short time.

The two next persons in the treatment of whom blood-letting was employed were cases of relapse. They were both females. Calomel and laudanum had removed entirely, for two or three days, every symptom of the complaint, but now the symptoms had returned, though their mouths were still under

the influence of the mercury. One complained of violent burning pain in the bowels, increased by pressure, much headach, and thirst. The other, in addition to severe twisting pain and sensation of heat in the bowels, had also urgent thirst and severe cramps. In both cases the pain in the bowels was relieved instantly by bleeding. The warm bath was used in the second case with the best effect. One or two doses of castor oil were afterwards given, and these patients soon recovered.

After this period bleeding was very generally adopted in the cases which I had an opportunity of seeing. Latterly also it was had recourse to by as many of the assistants as had learned to bleed, and sometimes it was urged even by the patients themselves and their friends. In almost every instance it relieved the pain of the bowels and the spasms. When the principal symptoms were great, oppression at the breast, laborious breathing, and a feeling of suffocation, or when the patient had locked-jaw, or general tremors with giddiness, bleeding was the only remedy which afforded effectual relief. When it could be obtained, the quantity of blood generally taken away was twenty-four ounces, and after such copious bleeding (for in a manner it may be called copious) no case occurred to me of the disease proving fatal.

In two or three instances, however, it was found expedient to repeat the blood-letting.

But while blood-letting, in an early stage of the disease, and under certain circumstances, almost uniformly produced the most decided and salutary effects; it was, in general, unavailing in the latter stages, or in the worst form of the malady, during which the limbs were cold, the pulse not to be felt, and the eyes fixed and sunken. In these cases it was impossible to procure a proper discharge of blood, which merely trickled forth in drops. Opening the temporal artery was attended with no advantage. By this means I never could obtain more than two or three ounces of blood. At the time no pulsation existed in the artery, and unless in one or two instances the blood flowed from the vessel without any pulsatory motion. Almost the whole of these attacks proved fatal. A few, however, in which the discharge of blood, though small, was followed by faintness and profuse perspiration, terminated favourably.

In the worst form a small proportion of the almost hopeless cases recovered, though not the smallest discharge of blood could be obtained. One of these was a boy about twelve or thirteen years of age. He complained of excruciating

pain in the liver, and severe spasms; his pulse could not be felt, and his limbs were quite cold. In puncturing a vein, I had little hopes of obtaining any fluid beyond an ounce or two, drop by drop, as in former instances; but I was somewhat surprised to find that the incision was not even tinged with blood. It had an appearance as if made in a dead body. The boy, however, was saved by the free use of calomel and laudanum, with powerful stimulant draughts, composed of hartshorn, ether, and brandy. In three other patients, one of whom died, the incision presented a similar aspect.

The cases in which there was an opportunity of using the warm bath were very limited in number; but, whenever it was used, it proved of great service in removing the spasms and quieting the patient. After the violent symptoms were subdued, small doses of calomel, combined with opium, were sometimes beneficially administered, and the bowels were kept free by the occasional use of castor oil.

Whether the disease be contagious or not, is a question which hasbeen a good deal agitated. The course pursued by the cholera, from one extremity of India to the other, unchecked by different states of temperature, and by great variation of the

seasons, its travelling, also, against the powerful monsoon winds, and its having been traced moving along the high road from place to place, have been urged as proofs of its contagious nature. The manner in which it was found to have originated, and spread at this place, lends further probability to this opinion. The introduction of the cholera to Bombay has been clearly traced to a person who came from the Deccan, and passed through Panwell when the disorder was raging there; and it has been generally observed here, that whenever it appeared in any particular spot or family, a considerable proportion of its members, or of the people in the neighbourhood, were attacked within a very short period of each other. On many occasions I have seen three or four of a family lying sick at once. In bringing forward these facts, however, it may be proper to state at the same time, that of the forty-four assistants employed under me, three only were seized with the complaint.

Debility predisposes to an attack of this disease. In Bombay the poorest classes have suffered most; those who live on meagre food, undergo considerable fatigue, inhabit wretched huts, and who are often obliged, not being possessed of a cot, to sleep on the mud-floor, with scarcely a cloth to

spread under them. Cold and moisture were strong predisposing causes. In the Kamati village, which lies low, and is surrounded, during the rains, with water, the inhabitants are chiefly Hummauls, who are much exposed both day and night. Among these people the disease was most rapid in its progress, and, in proportion, was attended with the greatest mortality. Among the better classes many individuals have been also attacked, but a very small proportion has died where assistance was timely procured. In proportion to its amount, the Mussulman population suffered as much as the Hindoo. In those parts of the native town which are inhabited chiefly by the lower classes of Mussulmans, and of that particular description called Memoms, the cases, on various occasions, were very numerous, and the mortality considerable. The diet and habitations of these Mussulmans differ very little from those of the Hindoos in similar situations in life. The preceding remarks will be considered as wholly applicable to the native population, among whom, from the first appearance of the cholera to the present date, medicine has been administered to 7,459 patients in the districts under my charge. Out of this number 441 died, which leaves a mortality of nearly six to one hundred.

No. 4.* The cholera has been in these cantonments since the 18th instant. In the 65th regiment it commenced on the 21st. The soldiers of this corps, being ignorant of the danger, did not report themselves when they first felt unwell. At the time of their admission into the regimental hospital the utmost debility was apparent, consisting of feeble pulse and cold extremities, with nausea, and constant vomiting and spasms. These symptoms were followed by universal sinking and coldness of the body. Death ensued in the space of twelve, fourteen, or twenty-one hours after admission. The warm bath, calomel, and opium were tried, along with the most powerful stimulants, with little advantage.

By the 22d, when the men had been duly warned of the danger incurred in not reporting themselves early, a different description of cases were received into the hospital. In these patients the skin was hot, the pulse full, and the vomiting constant. Bleeding was used in every case with such success, that I have no hesitation in recommending its adoption. In many the spasms were so violent, that it required six men to hold one

* G. Burrel, M.D. Seroor, 27th July, 1818.

patient. If relief were not afforded immediately, it is astonishing how soon the patient sinks under the attack. This stage was evinced in the extremities becoming cold, a livid circle appearing round the eyes, and the pulse and the motion of the heart rapidly subsiding.

Every patient who had extensive spasms was bled as soon as admitted, and the bleeding was in general carried to the extent of fainting. He was placed at the same time in a hot bath, the temperature being as high as 110 degrees. In this way the spasms were invariably relieved, and the nausea and vomiting alleviated. The stomach could then bear the exhibition of the calomel, in scruple doses, combined with laudanum; and these doses were frequently repeated. In short, opium, under every modification, was given with calomel; but I believe the calomel will be found to rest on most stomachs even in its simple state. The application of blisters was not attended with much benefit. Blood-letting has my full confidence. Among the Europeans in our hospitals the result was most striking, as it lessened in every case the irritation of the stomach, which is one of the worst symptoms of the disease. Blood-letting has been tried on the native assistants with the same good success.

I am cautious in reporting the cholera not infectious; almost every attendant in the hospital, during the short space of six days, has had the complaint; and there are about thirty attendants attached to the establishment. The regiment is about 800 strong. The admissions from the regiment bear no proportion to the number of the attendants who have been taken sick.

No. 5.* A stout and apparently healthy Hummaul of Mr. Marriott's, was suddenly attacked with cholera, and from the accounts we received, he appears to have almost immediately become insensible. It is difficult to obtain from a native correct information as to time; but from all I can learn, the attack began two or three hours before he was brought to Mr. Marriott's house. His hands, arms, and feet were then cold; he had no pulsation at the wrist; when questioned, however, he replied faintly. Mr. Marriott had him placed in a hot bath, and got a vein opened in the arm, which discharged only a small quantity of black blood. It was now that I saw him. While in the bath I opened some other veins, and divided

* Surgeon Jukes, to the President of the Bombay Medical Board.

both the arteries of the temples, but without effect. No blood could be procured. Brandy, laudanum, and ether, were poured down his throat. In another hour he died.

I have great pleasure in briefly relating another case which happened shortly afterwards at Mr. Marriott's, and where the most complete success attended our exertions.

A stout healthy peon of the collectors, while cleaning his gun in the Chokey, was seized with sudden giddiness, and he fell down insensible. He was carried instantly to the house of Mr. Marriott, who describes him to have been without pulse, and quite insensible. Mr. Marriott, before I arrived, had opened a vein, which now bled very languidly. The patient was completely insensible; there was a slight degree of warmth yet in the extremities, and a very obscure pulsation at the wrist; I immediately opened a fresh vein, and as the blood flowed from the latter, the vein which had ceased to bleed in the other arm began to pour out the fluid anew. Finding, however, that the blood still came slowly, I punctured a third vein, and had the gratification to behold the regenerated powers, as it were, coming into action as the blood poured forth from the three veins in full streams. Though perfectly insen-

sible when I first saw him, and his breathing slow and oppressed, his lungs now felt relief, and his breathing gradually improved. Motion perceptibly returned to his eyelids, and when spoken to, though he could not articulate, he comprehended what was said, and made signs that the symptoms were relieved. I allowed the blood to flow until I think forty ounces had been abstracted. By the time he had become a little restless, and his pulse quick, the arms were bandaged, and he was placed in a hot bath for a few minutes. A copious perspiration appearing, he was removed from the bath, and laid between warm blankets. I confess I have my doubts whether any thing beyond the bath and bleeding would have been necessary to secure this man's recovery; but as it was a severe case, I prescribed, in addition, fifteen grains of calomel, with fifty drops of laudanum, and a proportion of ammonia and peppermint. Three hours after the use of the medicine his skin was warm and moist, and he only complained of some uneasiness in his stomach, for which a few more drops of laudanum and peppermint were administered with effect. The evacuations in this disease appear invariably to have been destitute of bile, and they resemble rice-water more than any thing else.

Although people of all ages and conditions are liable to be attacked by the prevailing distemper, yet the weak and infirm are its favourite subjects, and undoubtedly suffer most when under the disease. Persons exposed to the inclemency of the weather, as travellers, and people at work in the rice-fields, are greatly predisposed.

It will not have escaped your observation, that the cholera travelled along the high road from the Deccan to Panwell. I have not yet heard of any village in the Conkan that has received the disease, unless by having had intercourse with the places previously infected. It is worthy of remark, perhaps, that the first person seized here, the 13th of August, was a man who belonged to a detachment which left Seroor on the 28th of July, while the disease was very general there. Several men, also of the same body, fell ill of cholera during the march, and were sent into Poonah. This detachment, which escorted the state prisoner Trimbuckjee to Tannah, came by water to Panwell, and landed at Chundnee the evening of the 12th of August. It was at Chundnee where the disease first appeared on this island.

I have had no reason, however, to say that the cholera has been contagious at this place. Neither myself nor any of my assistants, who have

been constantly amongst the sick, nor any of the hospital attendants, have had the disease. It has not gone through families here, when one has been affected. In many particulars it is very unlike common contagion. But at present there is considerable obscurity about this singular malady. The laws by which it has been moving from place to place are very unlike those of the generality of epidemics.

If the exciting cause be something in the atmosphere, which has exercised its influence from Bengal to the Deccan, how did it come directly against the south-west wind that has been blowing upon this coast since June? How does it happen that the winds from the ocean still spread the disease? And if it be something general in the atmosphere, why has it not hitherto made its appearance in some two distant parts of the province at the same time? Nothing of this kind has, I believe, been observed. It still seems to be creeping from village to village, extends for a few days, and then begins to decline.

In order to afford you every information in my power, I will just add, that, to common observation, there has not been any thing peculiar in the weather. The barometer has not been either remarkably high or low. The thermometer, for

the last month, has scarcely ranged more than from 76 to 82 degrees; and during many days has been nearly stationary at 78 or 79 degrees.

No. 6.* I am sorry that I cannot add much to your stock of information respecting the singular and interesting epidemic with which India is visited. I was absent on a tour into Candeish with Mr. Elphinstone during its prevalence here, and my experience is confined to the cases that occurred in our camp.

Our escort consisted of four companies of sepoys and fifty irregular horse. Several native gentlemen, with their followers, accompanied us, which increased our party to about 1,200 persons.

We left Poonah towards the end of June, and, after halting about ten days at Ahmednuggur, which was quite healthy, we arrived at Toka on the 13th of July. During this part of our journey, the wind blew an almost constant gale from the westward, and, beyond a shower or two, no rain fell. We were visited at Toka by a gentleman from Arungabad, who informed us that the cholera was raging in that city, and that, accord-

* Surgeon Coats, to the President of the Medical Board, Bombay.

ing to the prevalent opinion, it had been brought from Jaulnah, where it still existed. Moreover, that its progress through the villages, and along the post-road from Nagpore to that station, could be distinctly traced. The treatment chiefly consisted in the use of calomel and opium, and it had been particularly successful.

We arrived on the 19th in Colonel McDowall's camp, in Candeish, where the cholera prevailed; and the gentlemen generally believed that it had been introduced among them from Jaulnah, with which there was a constant communication. It did not appear that the disease existed in any of the neighbouring villages. Some Europeans had been attacked; and of the five persons so circumstanced, four died. Twelve cases had occurred among the natives; but the mortality was less than that of the former. The calomel and opium was fully tried on the Europeans; and, in the opinion of the gentlemen who adopted this practice, it rather seemed to aggravate than allay the symptoms. I do not recollect if the patients were bled, but I am inclined to think not. We took our position in the centre of Colonel McDowall's camp, and remained one day, exclusive of that of our arrival; and our people and his must have mixed with each other. The day after leaving

Colonel McDowall's camp, one of our sepoys was attacked on the march with the usual symptoms of cholera. He was in the rear at the time, and I did not see him until we came to our ground. The native assistant, however, gave him a dose of fifty drops of laudanum, and put him into a vehicle. When I saw him his extremities were cold, his pulse at the wrist scarcely to be felt, his countenance had the peculiar appearance expressive of the disease, and, although he did not complain much, he was very restless, and rolled about in his bed. I gave him twenty grains of calomel, and fifty drops of laudanum, with peppermint, and ordered him fomentations and frictions. He now became quiet; but there was no tendency to sleep, and the pulse did not improve for several hours. At length the pulse began to return; and a dose of castor oil and laudanum was given, which operated well, and the symptoms subsided. Several days elapsed before the patient recovered his strength.

We continued our journey through Candeish, &c., to Chandore, without having had any other patients, or meeting with the disease in any of the villages. A few days before we left Songeer, the cholera had reached some villages to the eastward. I was not able to trace by what route. It also

raged in Sir John Malcolm's camp at Mhow, in the Nerbuddah. We arrived at Chandore on the 16th of August. A great change of climate was experienced on passing the Ghaut at Chandore; the thermometer fell ten degrees, and the air had the coolness and elasticity of that of Poonah, instead of the moist feel of that of Candeish. Daily showers fell during the remainder of our journey; and occasionally the rain was heavy, which made travelling rather harassing to our followers. The cholera had reached Chandore before us, and there were a few cases in the town during our stay; but it had not been violent, nor had it excited much alarm. A communication had been kept up betweeen this post and Colonel McDowall's camp. In the evening of the day after we had left Chandore, the servant of one of the Brahmins of our camp was attacked, and he was brought to me about three o'clock in the morning. He was not then suffering much from either spasms or vomiting, and his master had given him a dose of opium. I ordered him twenty grains of calomel and forty drops of laudanum, warmth, &c. At daylight a report was brought that he was better, and that he had been sent forward on a camel. When we came to our ground, his pulse was scarcely to be felt, and his extremities were

cold. Another dose of the medicine was given, and frictions and fomentations ordered. He seemed to rally a little afterwards, but died in the course of the evening.

We arrived at Nassick the 21st of August, halted during the 22d, and left it on the 23d. The cholera had been raging there severely, and three hundred persons were supposed to have been destroyed. During our stay, though the disease was said to be rather on the decline, fresh cases were hourly occurring. Some of the Brahmins informed me, without their being particularly asked, that the disease had been brought by some individuals from Ahmednuggur. The town of Nassick is situated rather low, and sheltered from strong north winds; the streets are narrow and dirty, and generally slope towards the Godavery river, near which a tank is built. Our troops were cantoned to the north-west of the tank, at a distance of a few hundred yards, on an elevated, dry, and exposed spot. A free communication was kept up with the town; hut no case of cholera happened to the troops or followers during our short stay. The day after we left Nassick, however, a follower of one of the Vakeels was seized, and, the next day, two more were taken ill. The number of cases increased daily till the

28th; after which, they gradually decreased till the 3d of September. From this date, no new instance was recorded. The whole number of the persons affected amounted to thirty-two or thirty-three, and the proportion of deaths was seven.

From the above facts, and others which have been related, I am led to consider the disease infectious. Taking this opinion, however, to be well founded, it ought not to occasion much alarm, for it is only under some peculiarity of constitution the poison is enabled to act, and that peculiarity is fortunately very limited. In our camp about one in forty was infected; and I believe this is above the common proportion. If the disease were occasioned merely by a distempered state of the atmosphere, it would have spread over the country with some regularity. The cholera, on the contrary, seems generally to have travelled in lines along the post-roads, and has almost required a succession of subjects for its propagation. In Candeish, where the population is scanty, and little intercourse maintained among the villages, the progress of cholera was slow. At Punderpoor, the disease made its appearance at the time of the great Jatra festival, and was spread at once in every direction by the pilgrims returning to their homes. The poison, also, seems to have been

more concentrated there, from the presence of so many sources of production. The number of deaths in a few days was estimated at three thousand; and the patients are described to have been knocked down dead, as if by lightning.

In the treatment, I think calomel should be generally employed, but, regarding Europeans, not until the patients have been freely bled; and, in both Europeans and natives, not until the irritation of the stomach has been removed by laudanum. It does not appear to me that there is any necessity for such large doses as twenty grains of calomel. The laudanum or opium, moreover, should not be pushed beyond the quantity required to check the vomiting or purging, and to allay the pains and the cramps. The opiates did not produce healthy sleep in any of my patients. A sort of stupor or lethargy followed its administration in large doses. I had recourse to bleeding with the most beneficial effect. Bloodletting should never be omitted in the treatment of Europeans, and young, robust natives—and, indeed, generally, unless the persons are very old, or very far advanced in the disease. In many instances, notwithstanding the use of the above remedies, there was a considerable struggle, and it was some time before the healthy reaction

took place. In such cases, I always employed friction and fomentations. The patient was allowed to drink sparingly of warm rice-water; and to this was added, if he did not quickly revive, a little brandy, or draughts containing hartshorn. The instant the skin became warm, I administered a dose of castor oil and laudanum, which usually operated, and then I considered all danger removed. No disease that I have seen requires more attention on the part of the physician.

No. 7.* In cholera, the pulse is generally very feeble and small, and in many cases it is scarcely perceptible, or not to be felt at the wrist, even from the first attack. There is often great pain and sensation of burning heat at the pit of the stomach, the skin is covered with clammy perspiration, the eyes sunken, and the breathing oppressed. In some cases there is great restlessness and anxiety. In others the diminution of strength is such that the patients are unable to move. They lie prostrate on the cot, as if dead. It is possible, however, to rouse them from this state of apparent insensibility, and then they make replies as long as the tongue can give utterance.

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* Charles Daw, Surgeon, Aurungabad, July 29, 1818.

After articulation, indeed, has become impossible, they make signs which shew that the mind remains unimpaired to the last. At an early period, a most distressing thirst prevails, and the patients are particularly anxious for cold water, in preference to every thing else. Should this urgent desire be indulged, it will render the chance of recovery almost hopeless.

Europeans become predisposed to the disease, through intemperance, and more certainly if they expose themselves in a state of intoxication to the night air, or fall asleep in an open place. The fatigue and exposure to which the natives are subject, together with a deficiency of clothing, bad food, the eating of cold fruits, as melons, cucumbers, raw vegetables, &c. evidently lay them open to sickness, and never fail in producing more or less of fever and bowel complaints at this season of the year. But now, these common affections are much fewer in number than is usual, and the cholera has instead been the prevailing distemper.

The following is an illustration of what care and temperance can perform, in the way of preserving Europeans from the attacks of the cholera. Two bodies of men, one amounting to 300, the other to 100 persons, were located in adjoining

situations when the cholera arrived. The smaller body immediately determined to live temperately, and by avoiding the night air, and the other predisposing circumstances, which were obvious, to endeavour to escape the distemper. The plan succeeded so well that only one individual was seized of the one hundred. The larger body adopted no precaution. They lived in their usual way, and one tenth of their whole number perished.

No. 8.* We had been upon the look-out for the attack of cholera upwards of a month, and every precaution was used, and strict orders given, the moment a man was taken ill in the lines, by day or by night, that he should be brought to me. The first two cases commenced during the night, and notwithstanding the previous order, they remained in the lines, through their own obstinacy, until morning. At this time the advance of the disease rendered every remedial effort ineffectual. In one of them, an old man, the incipient symptoms were so mild that they did not attract the notice of the persons who were in the tent. The other patient was of a sickly habit,

* Surgeon Robertson, Camp at Keerky, Aug. 31, 1818.

and subject to occasional attacks of fever, which enabled him to deceive his serjeant—who was about to bring him to me—into the belief that there was little the matter.

The disease displays great variety in its mode of attack, which is certainly influenced by the constitution of the subject. Parts, also, that have been previously weakened by bad health, sometimes give rise to particular symptoms. Thus, among the admissions into hospital, I observed some men, who had been exposed to the causes of fever, were seized with a cold, shivering fit, and great weakness, they said, such as they had never felt before; and occasionally they complained of loss of sight. These symptoms were succeeded, in a short time, by a hot skin, quick and tolerably full pulse, acute headach, intense thirst, sickness, tendency to spasmodic twitchings, and sometimes vomiting, without their bowels being much affected.

A man, who had been subject to epilepsy, was heard at night, by the serjeant, moaning and grinding his teeth, in his sleep. The serjeant awoke him, and he instantly began to vomit. He was brought to me in a state of insensibility. Being roused with smelling salts, the vomiting again returned, and he immediately burst into

tears. He now complained of an unaccountable oppression of the chest, intense headach, and thirst. A dose of calomel and laudanum were administered, after which he fell into a sound sleep, and was quite well next morning.

No. 9.* Several people, seized with cholera in the bazaar fields, have suddenly become giddy, fallen down, and after one or two slight efforts to vomit, have expired.

Blood-letting must be performed early in the disease. In the latter stages, blood will not flow in any quantity, even from the jugular veins, or temporal arteries. Indeed, after the pulse has failed at the wrist, and the extremities have become cold, I consider the patient as almost irrecoverable.

I have had eleven cases of cholera: I bled the whole of them, some very largely, and then adopted the usual medical treatment. I am perfectly convinced that nothing but the bleeding could have saved the lives of three of them; and it has not been injurious in any. It was quite gratifying to hear some of them say, while the blood was flowing, "the pain in the head is gone,"

* Surgeon Gordon, Satara, 20th August, 1818.

then, "the burning heat in the bowels is also gone," and next, "the cramps have also ceased." If the patient is not brought very soon after the attack, the blood sometimes comes away, at first, only in drops; but after a little has escaped, the patient yawns, or takes two or three full inspirations, and then the blood flows in a stream.

In one case I opened a vein in the arm, but the blood would not flow. I tried the jugular vein, also, without much effect. I then punctured the temporal artery, which bled tolerably free. After a few ounces escaped, the circulation had so far recovered, that the blood began to flow from the jugular vein, and by placing the ligature again on the arm, the fluid came from it also, in a full stream. The pulse always rises, under the loss of blood, and the heat returns to the extremities as the circulation returns.

If the disease is so advanced that blood will not flow, even when the patient is placed in the hot bath, the case is desperate. Life may continue for many hours, and every symptom, save debility, may subside, yet nothing will rouse the circulation again.

No. 10.* It may be proper to mention, that

* Frederick Corbyn, Surgeon, Camp Eritch, Nov. 26, 1817.

laudanum, in a large dose of sixty drops, is not a stimulant, but a sedative; whereas in quantities of from fifteen to thirty drops, it has generally a stimulant effect alone. The former induces sound sleep, removes spasm and irritability; whilst the latter excites considerable uneasiness and convulsive startings. The variation of a dose of calomel has a similar influence. Calomel, when taken in a small dose, is followed by lassitude, sickness, irritation of the bowels, and purging; but in quantities amounting to fifteen or twenty grains, it has a sedative power. In large doses it allays vomiting, removes spasm, sends the patient to sleep, and produces moderate action in the bowels.

You will now perceive the principle by which I was guided in the treatment of my patients, labouring under cholera. My plan is not that of giving powerful stimulants, it is one which rapidly removes the spasms and irritability, composes the stomach and the bowels, invites sleep and tranquillity of mind, promotes the secretions of the liver, and opposes an inflammatory tendency. On the second day it was indeed a consolatory sight to observe the wonderful change in the character of the malady. The vomiting had ceased, the spasms were removed, the patient had expe-

rienced sound sleep, and the pulse had returned to the wrist.

In the treatment of Europeans, however, I should strongly recommend copious blood-letting; and a mixture, containing in one dose never less than twenty grains of calomel, sixty drops of laudanum and twenty drops of peppermint, which may be administered in two ounces of water. Should the blood not flow, immersion in a warm bath will have the most beneficial effect. When the evacuations are incessant as well as violent, we should not be afraid of giving eighty drops of laudanum, with the twenty grains of calomel, and using at the same time, an enema containing forty drops of laudanum. A few hours determines the fate of the patient, and these should not be lost by inactivity.

In the course of three or four hours, when the first shock is over, if much spasm and irritability remain, the dose of calomel and laudanum must be repeated. The patient will then, probably, fall into a sound sleep, and awaken, in some time, nearly recovered. The after-treatment will consist in keeping the bowels regular, and in giving some laudanum, to promote sleep. Bleeding, it should be remarked, is not adapted to old persons, who are weak, or worn down by disease. Among

the most urgent symptoms are the dreadful sensation of heat in the bowels, and at the pit of the stomach, and violent thirst. The frequent and lamentable calls for water, should never be indulged, for I observed many of the camp-followers who perished in the act of drinking. I allowed the patients to relieve their thirst with warm rice-water, and sentries were stationed at the hospital to prevent the introduction of common water.

I am of opinion, that unless the remedies are resorted to within six hours after the attack, the case is almost hopeless, at least, I recovered only ten patients in the regular form of the disease, after a considerable lapse of time; and, in these, the symptoms were moderate.

It is of the greatest importance to bear in mind that the calomel should be administered in *powder*. Many instances were observed in which calomel *pills* passed through the system in the same state as when they entered the stomach; for the same reason, laudanum is in general preferred to solid opium. The action of pills is necessarily slow, as they have to dissolve in the first place, and if they happen to pass without undergoing this process, no benefit whatever is derived.

No. 11.* The practice I pursued, in the management of cholera, was that in which large doses of calomel formed the sheet anchor. I have had the most manifest proof, both in this disease, and, formerly, in the treatment of fever and dysentery, that calomel in doses of fifteen or twenty grains, acts as a powerful sedative. It often allays vomiting, and removes uneasy sensations, when no other medicine will produce such beneficial results. I have always combined the calomel with either laudanum or the extract of opium, and usually added a few drops of the essential oil of peppermint to the preparation. Very often, however, the peppermint and laudanum seemed to increase the vomiting, in which case, after waiting a little, or after the application of the warm-bath, the dose of calomel was repeated in combination with the extract of opium and honey, or conserve. If the calomel and laudanum are rejected soon after their administration, without having produced any benefit, we must, in the course of a short time, always repeat them. The quantity of the medicine given in this way is of little importance; we should be guided by its effects upon the symptoms. In the mean time, it will be pro-

* Thomas Whyte, Surgeon. Seroor, July 28th, 1818.

per to prevent the patient from taking any thing into his stomach which has not been prescribed. The calls for cold drinks are constant, and if gratified, they will counteract every remedy, causing the vomiting, spasms, and other bad symptoms to return in their original violence.

No. 12.* In most cases of cholera I have succeeded in arresting the vomiting and purging, by the use of large doses of calomel and laudanum. It has been necessary, however, in almost every instance, to repeat the medicines, in order to allay the pain and spasms of the bowels. When this is accomplished, the coldness and the debility remain to be conquered, for which the most active stimulants are necessary. I have begun to prescribe arrack (spirits) in hot water, to the natives, for they are too numerous to be supplied with harts-horn, ether, &c. The coldness and debility have, in some cases, continued for twelve hours, when the favourable prognostics of heat and moisture gradually returned to the skin.

The disease has attacked the European soldiers in the 65th regiment, and in the artillery. To-day five of the former, and ten of the latter are

* Surgeon Wallace. Seroor, July, 1818.

affected. The symptoms are extremely formidable, and the prominent feature here, as in the natives, is the great and alarming debility. The same treatment has been found applicable to both. The hot-bath has been very beneficial among the Europeans, and I shall endeavour, in the course of the day, to extend its advantages to the natives.

The preceding treatment is very efficacious when adopted early; but the majority of the patients do not apply for relief until after some hours have elapsed. Then the medicine, in common with every other liquid, is almost invariably rejected by the stomach. To obviate this, I blended two grains of soft opium and fifteen grains of calomel with two tea-spoonfuls of honey, which was dropped into the patient's mouth, and, being swallowed, was often retained. The use of the hot-bath followed, and the patient was ordered to drink some arrack, mixed with hot water, spices, and sugar.

When the medicine was obstinately rejected in every shape, the patient has been placed in the hot-bath, and bled with evident advantage. The blood should be permitted to flow until the contractions of the muscles are subdued. At this period the stomach will frequently retain the medicine, and a favourable effect may succeed to its use before the recurrence of spasms. Should

these symptoms return, the bath must be tried again. A second bleeding, also, is sometimes required. We are engaged in a melancholy duty, and I fear the malady will spread over all the western provinces.

No. 13.* In many cases of cholera the primary symptoms are not uniform. In several, the vomiting and purging did not commence for some time; and, in two instances which came under my notice, neither of these symptoms were present. The spasms, however, pain in the bowels, and great prostration of strength, which almost invariably marked the disease, were very severe. Fainting was sometimes a primary symptom. In one case the sudden debility was strongly marked. A carpenter, while at work, fell down in a state of motionless insensibility. He was roused with some difficulty, and then the common symptoms became developed in so violent a manner, that he was carried off in spite of the medical aid which had been immediately procured.

No. 14.† The cholera had prevailed among the inhabitants of Nagpore, and the neighbouring vil-

* Surgeon Henderson, Kurrar, August 14, 1818.

† John Wyllie, Surgeon, Camp Nagpore, July 20, 1818.

lages, from the middle of May. It was attended with great mortality, and was generally diffused among the citizens, with whom the Sepoys had daily intercourse. No case, however, occurred among the troops before the 26th or 27th of the month, when three or four men of the depôt corps were attacked and fell victims. On the 30th the detachment which had been engaged in the siege of Chandah returned to this place and re-occupied their lines near the Setabuldee Hills. Previously to our return from Chandah, notwithstanding the excessive heat of the weather and the laborious duties of the siege, we had hitherto been tolerably healthy, and had not seen a single case of the genuine cholera. We had scarcely, however, taken possession of our lines when the cholera, like a plague, fell on the Bengal troops and followers. The havoc was dreadful. Our Madras sepoys and followers passed this day with impunity save in the solitary instance of a man who had been wounded in the assault of Chandah. He had nearly recovered of his wounds, but scarcely had he arrived here when he was attacked by the cholera. The troops that had escaped during the 30th paid dearly on the 31st. This day was marked with the signs of mourning and lamentation. The disease had spread throughout the camp, and of all attacked

at this time the greater proportion died. During the 1st of June the number seized was very great, but fortunately the proportion of deaths had greatly diminished. During the 2d there were not so many new cases, and on the 3d and 4th they were still fewer. After the 5th the number admitted into hospital was comparatively trifling, and although the disease still continued to shew itself, it ceased to spread to any extent.

In regard to the general history of this disease among the inhabitants of the country I am but very ill informed. From what I have learned, however, it would seem to have come from the north-east and to have advanced gradually in a south-westerly direction, taking Nagpore in its course, and committing the most terrible ravages. It would appear to be confined to a certain tract of country, and, if this is the case, the origin of the malady must be connected with a peculiar morbific poison in the atmosphere of that tract rather than with contagion or with any general atmospheric cause. Better accounts, however, of its locality and progress are required before that point can be settled with certainty.

No. 15.* I am extremely happy to have it in

* R. Orton, Surgeon, Bellary, Oct. 8, 1818.

my power to bear testimony, in the strongest terms, to the efficacy of blood-letting in the treatment of cholera. In four cases it failed, but in all of these the severe symptoms had been established, from five to thirteen hours before admission. In thirty-two others I have seen bleeding followed by rapid cures, though in fifteen of these the second stage had commenced. In none has it been unsuccessful when applied before or soon after the commencement of that stage.

Dreadful as this disease will prove, if neglected, it happily seldom omits, like the rattle-snake, to give us a salutary warning of its approach. It is an object of the first importance that these warning symptoms should be generally known, impressed upon the memory, and attended to. In almost every case the cholera commences with anxiety, lassitude, and giddiness. To the hand of another person the patient's skin feels moister and colder than natural. The pulse is usually quick and weak. Sickness and uneasiness at the stomach are complained of. The bowels are griped and evacuations succeed. If these symptoms are neglected, a new train more peculiar to cholera are sure to set in—great debility, thirst, burning pain at stomach, constant evacuations, spasms, &c. If the remedies are still untried, the pulse sinks

so as scarcely to be felt, and the patient tosses about in an agonized state. In three or four hours the disease has gained such ground that human efforts are generally unable to check its deadly course. In some cases, nearly in this state, I have seen bleeding succeed; but in two others it appeared to hasten the catastrophe.

The chance of success in the treatment of the malady depends much upon the progress which it has made when we happen to be called in; but few, at least of the actual sufferers, are sufficiently impressed with the vital importance of attention to this point. The severe variety of the disease seems to have a tendency to run on progressively to death unless interrupted by art. If taken in time, however, the cholera is probably more under the controul of medicine than any other dangerous malady. Almost all the fatal cases in the last attack, in the 34th regiment, were very considerably advanced before they came to hospital, and the deaths of a number of them may be fairly ascribed to that circumstance. Soldiers are usually so careless and stupid that it is very difficult to get them early to the hospital.

The weather had been extremely clear for a long time before the disease appeared in the 34th regiment. The first cases happened during the

evening of the 14th of May, and, on the following morning, the weather became cloudy, and it continued extremely so for three days. About the same time, the land-wind set in with great force, and remained for several days without abatement. As it appeared, from former accounts, that these winds had exercised a beneficial effect over the cholera, I was in hopes that they would now check its progress; but it continued to increase apparently uninfluenced by them. We had only two or three slight showers of rain while the malady prevailed. There was, however, much promise of rain to the westward; and I was informed that a heavy storm, with rain, had happened at Arcot. According to the newspapers, there was much stormy weather in the Bay during the month. I was informed, also, that a violent squall, with rain, was experienced in the camp of the 53d regiment about the time the cholera had commenced its attack.

No. 16.* Under our present knowledge of cholera, I shall not offer any particular observations regarding its exciting cause. The opinion,

* A. Connell, staff-surgeon, Secunderabad, September 26, 1818.

however, that it entirely depends on a morbific state of the atmosphere, is encumbered with many difficulties. For example, this malady, unlike other epidemics, has proceeded slowly over the country. It has followed, also, the routes most frequented by human beings, in direct opposition to the course of the winds. I am unable, indeed, to say, that it has never appeared in one place until after the arrival of individuals from another where the malady had prevailed; but, at first, its attacks are certainly confined to particular spots in the towns and stations which are subjected to its invasion. When the cholera raged in the Residency, and in the Begum Bazaar, near the city of Hyderabad, many days elapsed before it reached the Cantonment—a distance of only five miles. The city is only separated from the Bazaar by the river Moosa; yet the disease took some days to extend from the Bazaar to the city. The first cases that occurred in the Cantonment were among the Sepoys, who had returned from performing duty at the Residency. The different corps were afterwards attacked in succession. It will be difficult to reconcile these facts to the opinion which ascribes the disease solely to atmospheric influence. If the cholera were propagated by the atmosphere, we should expect that its pro-

gress would be more rapid, and that it would spread in a more general manner. I am unable, however, to give an individual case where I could positively say that the disease arose from contagion.

No. 17.* The cholera first appeared amongst the inhabitants of this place immediately after the departure of the 1st battalion of the 16th regiment, amongst whom it had been raging during their march from Hyderabad, and during their three days' continuance at this station. The disease had existed under its worst and most fatal form. All the powers of life sunk rapidly, without much previous vomiting, purging, or spasm. In this form, also, it has remained with us; and, without venturing to give an opinion of the manner, it has evidently been left with us by the above body of troops. There has been nothing uncommon in the state of the weather neither immediately preceding, nor since the appearance of cholera at this station.

Amongst the Sepoys who have come under my charge, the mortality has been very extensive, owing, in a great degree, to their delay in reporting themselves, as well as to the violent form of

* W. Train, Surgeon, Ghooty, February, 1820.

the disease. In an hour or two, they have often been reduced to a state of helpless exhaustion, from which the constitution could not be roused; or if, after the exhibition of medicine, a feeble attempt at reaction were evinced, the patients, in general, have sunk quickly into a state of greater weakness than before.

The practice I have followed has been bleeding in every case where blood could be procured. Most patients recover from whom a quantity of blood can be obtained. Frequently, however, on opening a vein, the fluid comes away only in drops, and even the most powerful stimulants fail in exciting the circulation. I have, in two or three instances, opened the temporal artery without any better result. The natives, moreover, having strong prejudices against blood-letting, and other remedies employed in this disease, kept away from the hospital as long as they could. Argument has no influence in removing these unfortunate peculiarities; and I have often observed that a patient suffering from cholera regards neither soothing language nor the greatest attention. Their prejudices, also, have an evil effect beyond the immediate victims. The patients who come late, and consequently die in hospital, leave an

impression on the mind of the other natives that medicine has no control over the malady.

The general treatment has consisted in giving, as soon as the case is admitted, a draught of laudanum with camphor, or hartshorn and peppermint, in hot arrack. Frictions, universal and partial, have been employed; mustard-poultices to the feet and hands, and heat to the limbs. Whenever there was irritability of stomach, a blister was applied over the part; and, in several instances where the vomiting has been excessive, I have produced erosion of the skin with the nitric acid prior to the application of the blister. The draughts were repeated according to circumstances. I tried the warm-bath on one man. He was much exhausted, the circulation languid, and extremities cold. I think he would have lingered some hours in that state, if he had been left alone; but, on putting him into the vessel of hot water, he immediately gave a shriek, and expired. A similar instance happened at Chittledroog; and I am quite convinced that the application of so general a stimulus as the hot-bath is detrimental to patients in the last stage of cholera. In the commencement of the disease, the hot-bath may prove serviceable, like other active remedies;

out the exhausted constitution cannot bear its effect.

Several circumstances have occurred during the attacks at this station tending to prove the disease contagious. Great numbers of men who have been waiting on their sick friends were lately attacked. It has generally happened that one person in a family having been seized, others in the same house have afterwards almost immediately sickened.

No. 18.* The treatment of cholera among the native inhabitants has been very successful. Where medical aid has been resorted to in any reasonable time, scarcely a single fatal case has occurred. Out of 292 patients, fourteen only have died, and these were persons who had been suffered to remain at their homes until the usual remedies were ineffectual. It is very distressing to observe the amazing apathy which pervades a very great proportion of the infatuated people. Numbers of them, who rejected the means that have preserved so many of their fellow-creatures, have fallen victims to their obstinacy. Expedients have been exhausted in endeavouring to convince

* J. Cother, Surgeon, Ramnad, Jan. 1819.

them of their folly, and without effect. Vytians and Hakeems, of different castes and respectability, have been instructed, and supplied with medicines to administer to the sick at their own homes; yet this plan has been attended with little comparative advantage. In the fort of Ramnad alone, eight or ten are now dying daily. In the populous villages of the districts, the same unhappy circumstances have been observed. Until a large share had paid the forfeiture of life, the inhabitants would not resort to the use of the medicine which the benevolence of government so liberally affords. On a tour lately through a diseased neighbourhood, I saw the melancholy fact exemplified in almost every village; and in one, where a great many persons had died, the survivors still refused the proffered assistance. Such is the prejudice of this darkly ignorant, and bigotted race!

No. 19.* The cholera continued here from the 5th to the 20th of January. It increased for three weeks, and subsided in the fourth. During that period, thirty-one Sepoys were attacked. The natives in the fort were affected a day or two

* Surgeon Mitchell, Palamcottah, Feb. 1819.

before the Sepoys; and, two or three days before the disease entered the Fort, it was prevalent in Walnaud, a village ten miles distant. As far as I can learn, the cholera appears to have made its approaches by neither of the great roads; it is, therefore, difficult to determine whether we had the disease from Madura or Ramnad. Commencing its ravages here to the eastward, and a little north of the Fort, it spread pretty generally through the small, low, dirty houses in every direction. The hospital seems to have escaped, probably because the building stood upon high and open ground. None of the inmates were seized. One of the orderlies, indeed, fell a victim; but nothing can be inferred from his case, as he was in the habit of absenting himself from the hospital at night.

It strikes me that the cholera must have been propagated through the atmosphere much in the same way as intermittent and remittent fever. When cholera was most virulent, the weather was close and sultry, and during the day the sun was obscured by whitish clouds. Had contagion been concerned in the production of cholera, we should have looked for it in the direction of the roads. We should, also, have expected to meet it in our hospital; as, at first, I was obliged, for want of

room, to put the cholera cases among the other sick.

No. 20.* The patient labouring under cholera frequently sinks on being taken out of the warm bath. Placing the patient in an erect position—an act more or less necessary while removing him from his cot to the bath—is often attended with a fainting fit, from which he sometimes does not recover. Most patients have an unconquerable aversion to the warm bath. I have known many, who were apparently in a state of stupor at the time, roar out with horror at the dread of immersion. Patients, generally, let the surface of their bodies be ever so cold, appear intolerant of the application of external heat in any form. In its use, therefore, we should carefully avoid interfering with sleep, which is of all things the most desirable. Heated sand or ashes may be included in a soft cloth, and applied in the gentlest manner all over the surface.

Travellers, on all occasions, appear to be more obnoxious to the attack of this disease than residents. They seem capable of carrying with them to a considerable distance, a sort of infected

* J. Chalmers, Surgeon, Tinnevelly, May 21, 1820.

cholera atmosphere, which is at times liable to affect themselves, or those near them. Thus far it may be said to be contagious; but that again seems to depend more on predisposition than does any other contagion with which we are acquainted.

Treatment.

1. I bleed freely, if possible.
2. Give twenty or twenty-five grains of calomel, and wash it down with sixty drops of laudanum.
3. Should this be rejected, a dose of sulphuric ether.
4. And, again, the calomel and laudanum, if necessary.
5. Counter-irritants to the region of the stomach.
6. Heated sand or ashes, in a soft cloth, to be applied gently to the limbs and surface of the body.
7. Anodyne enemas, if indicated.
8. When the patient awakes from his first nap, a smart purgative of jalap or aloes.
9. If the spasms have been severe, camphor and opium every two hours during their continuance.

10. For drink, the patient has, at first, warm rice-water, with ginger or spirits; afterwards, mulligatawney.

No. 21.* Many persons suffering from cholera have been picked up in the streets in a dying state, and all of these eventually perished. Some died in the vapour-bath. Such failures, however, should not bring our remedies into disgrace. Poor destitute wretches, who probably partook of no food for some days before they were attacked, and whom we were obliged to support while they lived, form the largest portion of our casualties. The disease did not extend itself as we had reason to apprehend. It first appeared among the Christians, who were glad of our medical aid; and then it extended to the Mapilas. These people still suffer, but they perseveringly refuse all foreign assistance. Their losses cannot be ascertained on account of the secrecy of their modes of life, and their particular prejudices.

No. 22.† It may be proper to mention a very singular occurrence which I lately witnessed. One

* J. Wyse, Surgeon. Cannanore, January 24th, 1819.

† Surgeon Mather. Cochin, January 1st, 1819.

of the victims of the prevailing deadly pest had terminated his existence with so little effort, that the last moment was not perceptible either to myself or to any of the bystanders. The peculiar fixed appearance, however, of the eyes and countenance soon rendered the fatal event sufficiently obvious; the face was covered, and in a few minutes I went home. In half an hour a hasty message arrived to inform me that motion had been perceived in a foot of the deceased. I considered it a mere illusion; but on my return, motion was clearly perceptible in one of the feet, and also in a hand; grasping the arm, an obscurely tremulous motion was felt pervading its muscles. Though the face and neck were stiff and cold, there was considerable warmth in the trunk, particularly about the chest. I immediately opened a vein in both arms. About half an ounce of dark, half-coagulated blood flowed from that in the left, after which there was sufficient action in the right arm to bend slightly the fore-arm. As the last act of duty, the body was placed on the steaming cot, and the result was what I expected.

No. 23.* The cholera appeared, the 18th of

* G. Bucke, Surgeon. Deccan, August, 2nd, 1818.

July, in the camp of the Mysore Silledar Horse, while encamped on the north bank of the Godavery. The sudden and great prostration of strength which the patients experienced, exceeded any thing that I could have imagined. It was not unusual for a Silledar to arrive at the ground of encampment in perfect health, be attacked with the disease, and in an hour become so weak as to be totally incapable of the least exertion, even that of sitting upright. Spasm in the muscles of the belly, thighs, legs, and arms, was almost a constant symptom, and the agony was dreadfully severe. The intervals of pain were exceedingly short, and the suffering consequently nearly continued, unless relieved by internal medicines, or the warmth of fomentations. If, in any case, spasm were absent, a burning pain was complained of at the pit of the stomach. The eyes were generally dull and heavy, and covered with a glutinous film; for a short time before death they remained insensible to the impression of light. The tongue was covered with a brown slimy crust, and in no instance did it appear clean. Headach was only an occasional symptom. The thirst was excessive, with a strong desire for cold liquids, the use of which would have proved highly injurious. In one case alone was the heat of skin

above the natural temperature; in every other it was below, and frequently covered, after a fit of spasm, with cold, clammy perspiration.

No. 24.* Twenty-nine men of his Majesty's 84th regiment were admitted with cholera last month, of whom five died. Of the European artillery, eight were admitted; and one man, a serjeant, died. There have been many women attacked, European and native, belonging to the soldiers in the fort; but few children have been subjected to the disease. In the European and Sepoy hospitals, I have observed that the malady more generally attacks elderly people rather than the young; and this I am told is also the case among the native inhabitants.

The cholera has now reached Ghooty, and is travelling along the high road to Cuddapal and Madras. There is much difference of opinion here as to whether the malady is infectious.—*Causa latet, vis est notissima.*—There is one fact certain, that his Majesty's 34th regiment carried it with them from Bellary to Nundydroog, and that there was no trace of the disease in the vil-

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* J. Duncan, Surgeon, Bellary, Oct. 13th, 1818.

lages on the road. Since the regiment passed, every village on this road has been invaded.

No. 25.* If I were to act discretionally, in the event of a second visitation of the cholera, I would use the lancet in very many instances, and the subsequent treatment would be guided according to the degree of spasms or other urgent symptoms. Immediately after bleeding, the patient should be placed in the vapour-bath. As far as my experience goes, the vapour-bath is far superior to the common warm-bath; for in the former the patient is not exhausted; whereas immersion, in the latter, even during five minutes, increases the debility. The patient may remain in the vapour-bath from twenty to fifty minutes. The inhalation of the steam is beneficial, as the warmth is imparted in this way directly to the lungs.

No. 26.† The poorer classes seem to suffer most from cholera—the Mohammedans in a greater proportion than the Hindoos; and of these, the Pariah more than any other caste. Very few, comparatively, were attacked among the half-

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* Sir T. Sevestre, K.T., Surgeon, Madras, Dec. 25, 1818.

† Surgeon P. Scott, M.D., Madras, March 31, 1819.

caste population. Of the trades and occupations, the oilmongers, cowkeepers and washermen, and the boatmen seemed most liable. Of the sexes, the male rather exceeded the number of the females; and the old of both, rather than the young. Indeed, I am inclined to think that a large proportion of cases occurred amongst such as had arrived about the middle and at an advanced period of life; and amongst such as were infirm, and of a spare and delicate constitution.

Neither pregnant women nor infants seem to be exempt from its attacks; but instances of the latter were exceedingly rare. The disease has been observed, I believe, to be less violent on the sea-coast than in the interior; and the total number of deaths at Madras is, proportionably, much less than has occurred at inland stations.

I ascertained that a great many persons were seized under circumstances of exposure at night, or of a certain predisposition of body. Many, after intemperance, fatigue, or any sudden exhaustion—a state which evidently seemed, from whatever cause it was produced, to render the body more susceptible of the morbid impressions. Instances of this were seen in individuals who were almost immediately attacked on their arrival at Madras, after a long and fatiguing journey. Very

few of the lower castes escaped who were given to intoxication and slept exposed to the night air.

By far the greater number of persons were seized suddenly between five and seven o'clock in the morning, or in the evening soon after sunset. It was not, however, very uncommon for people to be attacked during the day. Of these I saw several who had fallen down on the road, and suffered from the complaint in rather an acute form. Many I found taken ill in the morning, almost immediately after eating their usual meal of cold rice. Whether this may have had any share in exciting the peculiar morbid action in the body, already perhaps predisposed to its influence, or whether it was merely the effect of accident, I have not been able to ascertain. Several intelligent natives, however, say that persons who used warm rice in the morning, instead of the cold, were less liable to the attack. How far this is founded in fact, I cannot give an opinion.

The debility was the most remarkable symptom. In one man, whom I had occasion to see, the prostration of strength was so great that he could hardly move a limb, though he had been, fifteen minutes before the seizure, in perfect health, and actively engaged in his usual occupation as a gardener. Spasm was also a predominant and severe

symptom in many. In robust persons the spasms were generally accompanied with writhing of the body and countenance, and moaning peculiarly expressive of distress. In those of a slender make, and who, as formerly remarked, were frequently the cases that came under my care, the disease appeared in a less aggravated form, at least as far as regards the cramps. Here the cramps were usually slight, and the patient would merely complain for a short time of griping pain and drawing in the limbs. Many of the old and infirm, after a few discharges, especially when they followed in close succession, sunk rapidly into a listless, cold, and motionless state, in which the powers of life seemed to be nearly suspended for several hours before death closed the scene. Fever very rarely attended the attacks of the disease, and delirium, or even confusion of thought, were scarcely ever observed until great exhaustion had taken place. The tongue was generally moist and clean.

I am led to think that the origin of cholera may be found to depend chiefly on a noxious exhalation in the atmosphere, and which had been produced by certain natural processes, maintained on the surface of the country in consequence of the unusual and unseasonable falls of rain that

had for some time before taken place so generally over Hindostan.

No. 27.* I received accounts of the cholera having made its appearance in different parts of this district early in November last. About the 22d of the same month, I saw some cases of it at this station and the villages in the neighbourhood. From that period to the beginning of December, it continued to increase, and carried off great numbers. After the first week in December, the disease abated, and decreased gradually to the end of the month. Still, however, a number of cases appeared daily; and about the middle of January it recurred with nearly its former violence. It continued to spread for a few days, and then rapidly subsided again. Now very few cases occur.

With respect to the contagious nature of the disease, no circumstances of much importance have occurred to me. In compliance, however, with your request, I beg to mention those which seem to belong to that part of the subject. When the disease appeared in this neighbourhood, I frequently observed that some villages were affected,

* J. Whyte, Surgeon, Combooconum, Feb. 7, 1819.

while others, though situated at no distance, and also the town of Combooconum, escaped for a time. However, after Combooconum was invaded, I constantly observed that the cholera raged with violence in some parts of the town, while others remained for a time healthy. In some instances, it was not until several days had elapsed, that the latter came to suffer in their turn. This seems to militate against the source of the disease being alone in the atmosphere; for all these places must have been equally exposed to the action of the air. A similar conclusion is supported by the circumstance that the cholera has continued to spread under all atmospheric variations. I am inclined to consider the disease as contagious, and that it is propagated by effluvia arising from the body.

No. 28.* There being much reason to believe that the cholera, which has made such extensive ravages in different parts of India, would make its appearance in this camp, every step was taken to resist the attack. Many families of Sepoys, &c., on their road from Jaulnah to this camp, died of the disease, and those who arrived were the first

* J. Dean, Surgeon, Camp, Candeish, August 5, 1818.

that suffered. No case was observed, even of a suspicious nature, until the 13th of July. The morning of the following day I heard accidentally of a man who had been taken ill with vomiting the preceding evening. The symptoms had increased during the night, and he complained of violent pains about his bowels. At day-light, the dresser was sent for; but the man was dead before he arrived. While learning the history of this man, I was, informed that a native woman, belonging to the artillery, was then labouring under the disease. I immediately went to the hut, but she had that instant expired. This woman was recently arrived from Jaulnah. Her friends, who accompanied her, described the disease which caused her death to be of the same description as the cholera which had been so fatal at Jaulnah.

No. 29.* The number of deaths here has been much greater than I had led myself to expect. The disease seems to occur with very different degrees of virulence in different places, and even at different times in the same place: for example, in this camp the first invasion of the disease was much milder than the second. During the latter

* W. Wilson, Surgeon, Mhow, Sept. 7, 1818.

attack, moreover, it varied considerably in violence at different times. Almost every man who was taken ill on the 19th and 20th of July, perished. It also may be stated, as a reason for my being less successful than I expected to have been, that the malady had advanced considerably before many patients could obtain assistance to convey them to the hospital; and when arrived, having no person to pay particular attention to individual cases, I found it next to impossible to prevent their drinking of cold water. The rains prevailed at the time, and if the patients could not procure the water otherwise, they drank it from the pools about the tent. Neither could I be as much with the sick as was desirable: in visiting the three hospitals of which I had charge, I had to travel a circuit of five miles; the patients, therefore, were necessarily committed for long periods to the care of native assistants, and even of these, only one could be given to each hospital.

The natives of this part of the country are in the habit of administering a strong solution of common salt in water, to patients in cholera. Some give a mixture of arrack and onion juice. These remedies have a strong emetic effect, and the natives say that the practice is successful. After leaving Mhow, I gave tartar emetic to one

or two slight cases, with certainly a good result. An opportunity, however, has not occurred since of trying this plan sufficiently.

It appears impossible to say what is the cause of this disease. It has been raging in one quarter, so that a single march will take you clear of its range. Almost every village, however, has had it in turn. The cholera is clearly independent of any sensible change in the state of the atmosphere. We have seen it in the hottest and in the coldest weather, and during the rains.

No. 30.* A detachment of Europeans from Madras, under the command of Major Wahab, arrived here with the cholera amongst them. The disease first attacked the setroops at the Kistnah, after exposure to a heavy storm of wind and rain, and it continued with them from thence to this place, although all the villages in their route were entirely free from the disorder. During the march, sixty individuals perished, of whom eight were Europeans. On its arrival here, the detachment encamped about two hundred yards in front of our artillery lines. In this new situation, three

* A. Connell, Staff-surgeon. Secunderabad, May 20th, 1819.

Europeans and a number of natives died. At this time no case of cholera had occurred in the encampment. The Europeans, however, of Major Wahab's detachment mingled with our party of artillery; and, in the course of four or five days, the disease began among the latter. Several were severely affected, but they all recovered through the prompt medical assistance afforded. The next seized was the wife of a conductor, in the artillery lines. She was attended, for a couple of hours, by her friend Mrs. Gray. Mrs. Gray was seized soon afterwards, and died the ensuing morning. The son of the latter, a boy about six years of age, was infected the day after his mother died, and recovered. My sub-assistant, Mr. Hoskins, who was constantly with the sick, contracted the disease and died in twenty-four hours. Another acting sub-assistant, Mr. Sleven, who attended particularly to Mrs. Houghton, a patient that had suffered severely, was attacked; and, Mr. McDougall, an assistant-surgeon, who was much among the sick, was also seized. From the artillery lines, the disease travelled to the bazaars, and many of the natives were carried off. The men of his Majesty's 30th regiment who are in barracks about half a mile to the right of the

line completely escaped, not a man having been affected or any of the followers.

I beg to add that Mr. Jones, surgeon of the 6th light cavalry, has just arrived from the Kistnah, by the same route as Major Wahab's detachment pursued. Mr. Jones states that he found the cholera prevailing in every village, having commenced soon after the passage of Major Wahab's detachment. The inhabitants said they had got it from that detachment.

How far any of these facts seem to indicate that under certain circumstances this malady is of a contagious nature, I shall not pretend to determine, but during our present uncertainty on that point, it might be advisable to prevent troops, who have the disease, from encamping in the immediate neighbourhood of cantonments and stations.

The most effectual treatment, with the Europeans, was immediate and copious blood-letting, and then calomel and laudanum. I have observed that cases in which there is much vomiting commonly terminate in a favourable manner. The frequent vomiting shews that the stomach has not entirely lost its vital powers. On the contrary, in those cases where there is much purging with little or no vomiting, death generally ensues; and the most speedily fatal are the attacks in which there

is little of either vomiting or purging, shewing, as it were, that the whole alimentary canal is in some degree paralysed.

No. 31.* Before speaking of the cause of cholera, I beg leave to advance the following facts on which my opinion is founded:—

1st. Several showers of rain fell about the middle of June, which considerably reduced the temperature of the air. The weather since has been cool and pleasant. The thermometer seldom varying four degrees in twenty-four hours. The wind blowing steadily from the S.W. The sky has been generally cloudy, and the heat of the sun has never been great.

2nd. The cholera prevailed in Nagpore, during the month of May. Upon hearing of the march of Captain Doveton with a detachment in which the disease existed, it was generally apprehended that the men would bring it here. The detachment arrived here towards the end of June, and the cholera commenced among us, the 3d of July.

3rd. The Russel Brigade arrived here on the 4th, and left this the 5th, without a symptom of the disease. In a few days after, it broke out

* J. Kellie, Surgeon, Jaulnah, July 7th, 1818.

among them, and was attended with great mortality. Messrs. Palmers' party arrived the 4th, and marched on the 6th, without sickness; before they had reached Aurungabad many of the party were attacked. The disease began in Aurungabad, soon after their arrival.

4th. The first case I heard of at Jaulnah, was in the death of a woman of the Sepoys, encamped in Cawderabad. The first case I saw was the son of the preceding, a boy of four years old, who had been constantly with his mother during her illness. Shortly after her death he had been seized with similar symptoms, and in a few hours he was also carried off. From this period the disease spread rapidly as from a focus among the inhabitants of Cawderabad, and on the day following it extended to the troops and to the bazaars.

5th. Cawderabad is situated towards the rear, and to the right of the lines. The disease raged most severely about the right, centre, and the bazaars, the streets of which extend to the gates of Cawderabad.

6th. The Royals were immediately in front of the general bazaars, with which they held constant communication. They suffered much from the malady.

7th. The men of the Horse Artillery were a considerable way in front. They had less direct

communication with the general bazaar, and little intercourse with the Royals. They suffered comparatively very little.

8th. A woman having been taken ill, was assiduously attended by her daughter, who became soon after infected herself. Two children, whose mother had died of the disease, were discovered in the bazaar, lying under a blanket. The elder, about three years old, had received some medicine, and was slowly recovering. The younger, a baby of ten or twelve months, who had been clinging to the breast of his dying parent a few hours before, was now in the last pang. Instances of this sort were numerous.

9th. Of the European patients in Field Hospital for other complaints, three were seized with cholera after patients had been admitted with the same disease. Of these new cases, two, one on each side of the ward, were at the part nearest to that which had been appropriated to the reception of cholera patients.

10th. Orderly Sepoys, attending on the sick, were so generally attacked, that their attendance came to be enforced with difficulty.

11th. When it appeared in a family, it usually happened that several of its members were seized.

To these facts I have been an eye-witness, and

from them I infer that the cholera is occasioned by a specific morbid poison, *sui generis;* that this poison is formed by the disease itself, and that the disease, in consequence, is communicated by contagion from one person affected with it to another.

* In observing the further progress of this dreadful malady, I am still the more fixed in my opinion of its contagious nature. How, it may be asked, is the poison produced? Is it generated in a place? Or is it carried into the locality? If generated, and not contagious, the operation of the poison would be confined within certain limits to the particular spot, as it happened to be diffused through the atmosphere. It might float for a time upon a gale, accompany the seasons, and be connected with the meteorological changes. But cholera has observed none of these habits. The disease has travelled in the very face of the wind from village to village, from one military station to another, and in the exact route of troops. From Nagpore to Jaulnah, from Jaulnah to Aurungabad and Mulligaum, from Aurungabad to Seroor, and from that to Bombay. It has progressively visited the different villages between

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* Second Report, dated October 7th, 1818.

this and Hyderabad. At Hyderabad two officers have lately fallen a sacrifice to the malady. One of these had constantly attended the death-bed of the other, and he himself was a corpse forty-eight hours after. And are not these facts indicative of contagion? Shall we still be answered by the puerile question—"If it be indeed contagious, why are not all people equally liable to the disease, or why are not the medical attendants themselves attacked? This knot is scarcely worth untying, we may cut it at once. We are all liable to it, and will be attacked whenever exposed to the poison in a state sufficiently strong to act on our constitutions, provided they have been prepared for the reception of the virus by any of the various predisposing circumstances. Why does vaccination so often fail? And how does it come to pass that the plague has not overspread the world?

No. 32.* The cholera broke out shortly after the junction of a large detachment from Chicacole, and just at the time when another joined from Masulipatam. I am uncertain whether to attribute this circumstance to an accidental coinci-

* Surgeon Wight, Samulcottah, March 23, 1822.

dence, or to suppose that it was brought by these troops. The first patients were Samulcottah people, and I did not hear that any cases had occurred in the detachments on the route. The disease, I believe, is generally considered to be non-contagious; but there is perhaps some reason to suspect the accuracy of this opinion, when we recollect that it appeared first in the lines of the battalion, and that for some time it had almost invariably attacked bodies of men upon the march. The troops lately arrived may not have had cholera actually raging among them, although its fomites were present and ready to be called into action whenever the predisposing circumstances occurred. The people of Samulcottah seem to have been placed under the influence of these circumstances, for the disease immediately began to spread amongst those with whom the strangers first associated. These facts appear to shew that contagion assists in spreading the disease. But how are we to explain, according to this view, the sudden decrease of the malady without the adoption of any measures to effect its suppression? The same thing, however, has been observed with regard to every contagious epidemic, not excepting even the Egyptian plague. The plague is as constantly

found in Constantinople, as the small-pox is in London; and, like the latter, it only prevails extensively in particular seasons.

No. 33.* The malignant cholera, which appears to have originated at Jessore, is said to have extended to the adjacent villages, and to the whole province of Bengal, including the principal cities on the east and west side of the Ganges, in a progressive manner. In the upper provinces of Hindostan, its visitations were observed to be more irregular. Here, we are told, it often happened, that a village situated on the line of route, apparently taken by the malady, would remain untouched, while the people of the adjacent country were suffering severely; and, that after a time, when the disease was subsiding among the latter, and the inhabitants of the village were about to rejoice in their exemption, it would return, and depopulate the spot that had previously escaped. It is also observed, that after it had taken a considerable course along one side of the Ganges, it would ultimately visit the opposite bank. The analogy existing between cholera and the Egyptian plague is very conspicuous. Her-

* R. H. England, Surgeon, 1821.

nandez observes, "We have seen this disease cease to commit its ravages, by the mere interposition of a wall or a river." Prosper Alpin, Russel, and Sonnini have remarked, that patients afflicted with the plague, on being brought from an infected spot, and carried into a place where the predisposing circumstances do not exist, lose the power of communicating the disease to other persons. Infants are more exempt from the attacks of plague than persons grown up. As far as my observation extends, the same rule holds in cholera. I have seen several young infants, who depended on the breast for nourishment, exposed to all external influence in common with their mothers, yet, while the latter were expiring under severest cholera, the children lay beside them in perfect health. In consequence of the sudden appearance of cholera in a spreading form, its attacking, in various places, persons of different ages and temperaments, and its equally sudden departure, an inference has been drawn that it is under atmospheric influence, and that it cannot be of a contagious nature. The grounds of this opinion are too slender and doubtful to carry conviction. Two old buildings, situated in the town of Tutocoreen, which I converted into hospitals, contained on an average about 250

sick men of the first battalion of the fifteenth regiment of native infantry. The healthy troops of the same battalion, were encamped about a quarter of a mile from the town. In a period of twelve days, five mild cases of cholera occurred amongst the sick men in hospital; and during the same space, the number of persons attacked belonging to the healthy troops, amounted to twenty-eight. A second dresser and a servant of mine, who were much employed about the sick, took the disease and died. I experienced two mild attacks myself, and two other medical servants attached to the battalion were seized. I find that the disease has prevailed among the attendants in various places. These occurrences, together with the progressive extension of the disease over an immense track of country, tend to establish a contagious principle. Troops, and travellers of various descriptions have suffered from cholera during a march in places where no vestige of the disease could be traced among the inhabitants, though they too were equally exposed to fatigue and privation. We must, therefore, infer that atmospheric influences are not at all times, if ever, sufficient to propagate the disease extensively without an additional agent. Shortly after such visitations from troops

and travellers, the disease has been observed to attack, for the first time, the inhabitants of the places visited. The cholera has prevailed in both wet and dry weather, and it has been noticed that a change from either of these states to the other, has been attended with a mitigation, and sometimes a temporary cessation of the disorder. I witnessed its dreadful ravages in the fifteenth regiment of native infantry, during the stay of the troops at Tutacoreen, in February, 1819, and on their subsequent march to Quilon. The weather was not considered unseasonable. In those places which we visited, in the vicinity of the coast of Coromandel, and in the district of Tinnevelly, the weather appeared clear and rather warm. On the Malabar coast, the rainy season commenced rather early, and it was accompanied with a mitigation of the disease.

I had heard that emetics were found useful in the treatment of cholera. Being scrupulous in making the experiment, I have tried the remedy in only a few cases, that were in a hopeless state, and that had resisted the remedies commonly prescribed. In four cases of this kind where I tried the emetics, two proved fatal, and two recovered. One of the latter had suffered severely from the disease though he had been bled, used

opium in various ways, and had taken the other contingent remedies. By the eighth hour of the attack, he was visited with the majority of those symptoms which are considered indicative of a speedy and fatal termination. Despairing totally of his recovery, I commenced giving him at this period a third of a grain of tartar emetic, every fifth minute, with large draughts of warm milk, until it had made some sensible effect on the stomach. At the expiration of forty minutes, the effect was evinced in considerable nausea and occasional vomiting. The use of the tartar emetic was then discontinued, but the milk was not stopped. In the course of an hour, the system presented a favourable change. The cadaverous feel, and collapsed state of the countenance gradually wore off, the animal functions slowly returned to a healthy standard, and the patient recovered. The other case, which terminated favourably, very much resembled the one just described, and the treatment was similar, with the exception of the milk, as thin meat broth was substituted. In the two fatal cases, the patients lived longer under the malady than is usual. In some cases, where a few of the precursory symptoms of cholera existed, and which would most probably have led to the complete for-

mation of the disease, I have given emetics, and with perfect success in checking the symptoms.

No. 34.* On the road from Nagracoil to this place, several of the Sepoys and some of the followers were attacked with cholera, and since we arrived others have been taken ill, shewing that they must have brought it with them in a dormant state. Several of those that attended the sick have been also seized; and there is some reason to think that the effluvia from the dead body has produced a few cases. In the limited number of patients treated here, blood-letting was resorted to, and where the blood could be procured in a full stream and large quantity, the cases uniformly recovered. One of my servants presented a rather remarkable instance. Previous to the attack, he had been much exposed to the rain at Nagracoil, and had also attended the sick. The disease was very severe, and he was bled to the extent of twenty-four ounces, which came away in a full stream. The usual dose of calomel and laudanum was administered, and soon afterwards he was reported "fast asleep." In the course of two hours, however, the disease had

* Surgeon Provan. Travancore, Nov. 5, 1819.

returned, with increased violence. When I saw him, the pulse could barely be felt vibrating occasionally. Veins were opened in both arms, and the blood came away, sometimes in drops, sometimes at intervals, and sometimes in a stream, for a few seconds. By persevering in this way, during upwards of an hour, it came at last in a full stream, and about sixteen ounces were taken. After a severe struggle he recovered, and is now only suffering from the effects of an acid blister.

No. 35.* The second battalion first regiment native infantry left Nagpore February 6th, 1821, under orders to march to Trichinopoly. The men were then in a healthy state and continued so, with the exception of trifling complaints, until they arrived, March 11th, at Secunderabad. Here they were encamped (men and officers) in a small recess among slightly elevated hills, near the Hoosum Saugur tank. The families were in more open ground, but it was low and near the edge of the water. They remained in camp while the sick carriage and other necessaries were refitting, to enable them to proceed on their route. During the whole of this period no case of cholera oc-

* J. Stokes, Surgeon, 1821.

curred. The disease did not make its appearance before the 19th of March, when Thomas Hitchens, quartermaster-sergeant, was suddenly seized at night, and died in the course of twelve hours after the period of attack. In reply to inquiries regarding the history of this case, it was said that Hitchens had been a good deal exposed for some days to the influence of the sun; that he had frequently stayed out late at night, and drank freely. After the attack of Hitchens, fresh cases continued to occur. By the 21st, as the troops approached the Kistnah river, new instances of the disease were observed now and then; but they were for the most part mild and tractable. During the 1st of April the party crossed that river, and pitched their camp on a sloping ground of black soil, near the village of Khatoon. The cholera now began to spread rapidly and with malignity, creating alarm in every direction. The followers and the women were the first that suffered: it commenced among the latter almost as soon as they had crossed the river. The number of deaths that took place this day was considerable. The ensuing day, April 2d, the ground was changed to Byeapore, and the camp pitched on high, clean, red soil. There was now a trifling di-

minution of the number of seizures, but no abatement of the mortality. April 3d, the troops crossed the Toomboodra river, and came to Kurnaul, where they remained to the 6th encamped on high ground. The violence of the disease had somewhat abated, but there was no prospect of its subsiding. The casualties, though less than in the preceding days, were still considerable. April 6th, the battalion moved, and came to Pundypad; 7th, no abatement in the disease: the deaths were many, and among them, Mr. Assistant-Surgeon Rumbold. Mr. Rumbold awoke in the middle of the night, and complained to an officer sleeping in the tent, of an extraordinary feeling of anxiety and giddiness. He had only two or three evacuations, which were quickly succeeded by great prostration of strength, and death in a few hours. Mr. R., previously to the attack, had undergone much fatigue, both of body and mind, and was very apprehensive that he should take the disease. The cause of this dread seems to have originated in a circumstance which happened the first or second day of the active period of the malady. While visiting some bad cases, he became affected with a nausea and giddiness, and, coming out of the tent,

he fell down in a fainting state. From that period he believed or fancied that he would die of cholera. By the 25th the cases were less numerous and much milder in their symptoms. From this to the 9th of May, few patients presented with the usual symptoms: they had merely slight purging, exhibiting the disease perhaps in the mildest type. So trifling were these affections, that they generally subsided in a spontaneous manner, or after a little medical treatment.

Some cases may now be mentioned which would seem to favour the supposition that cholera may be communicated from the sick to persons in health. During the 1st of April, and immediately afterwards, when the violence of the disease was extreme, the circumstances were unfavourable to much inquiry or observation regarding its nature and properties; but as the malady decreased in malignity, and the attacks became less numerous, and milder in their symptoms, a facility was afforded for learning their history and watching the occurrences developed in their progress. With many patients that came to hospital, it was found that some time previous to their having been attacked, the disease had existed in their families

to a greater or less extent. In one family, a single member had been taken ill or had died: in others, the cholera had spread progressively through the whole, or nearly, and also among such as officiated as orderlies or attendants in the hospital. Of the latter, the first person attacked was a man who had assisted in applying frictions to Hitchens. The next was the second dresser; then Mr. Rumbold. A mother and daughter lived in the same tent: the mother was seized with the complaint, and the daughter contracted the disease soon afterwards. Of two boys, servants of Colonel Bishop, one died on the 16th, and his fellow-servant, who attended him died on the 18th. Goopaloo, a drummer, died on the 18th, and another drummer, who had been his orderly, was attacked. Two brothers, who had been living in the tent where their mother died fifteen days before, were admitted into hospital. Sick men, from being in the same place with cholera patients, took the disease. Several facts similar to these might be adduced.

No. 36.* I shall proceed to make a few remarks on the contagious nature of cholera. The vast

* E. Chapman, Surgeon, 1821.

difference of opinion, however, which exists upon this subject, shews that my observations should be introduced with the utmost diffidence. As proof of the non-contagious nature of the disease, I have heard it stated in argument that "being an epidemic, it can only be communicated by means of the atmosphere." That it is an epidemic there cannot be the slightest doubt; but it is by no means incompatible with diseases of this kind to be also of a contagious nature. Epidemic maladies, indeed, are very generally capable of being propagated through the medium of contagion. Typhus fever, for example, often attacks the population of an extensive district, yet none who have ever witnessed its ravages will question its frequent propagation through the influence of contagion. Small-pox commenced its inroad in the form of an epidemic, and I would ask is it not likewise a contagious malady? The same holds with regard to measles, and scarlet fever. In short, it would appear that epidemics, for the most part (however certain it may be that they depend for their *origin*, in the first instance, on a morbid change induced in the atmosphere), are susceptible of communication and consequent propagation by contagion.

As it does not appear, therefore, to be incom-

patible with the nature of an epidemic to be also contagious, and as such is very generally the case, let us proceed to examine some facts that occasionally occur with regard to the cholera.

A corps or detachment, on the route, is invaded by the disease, and a number of individuals are suddenly affected. Here the malady is commiting its ravages in the character of an epidemic, in consequence, perhaps, of its prevalence at the village or place of encampment. At a short distance, however, from this, in a number of instances, no cholera is prevailing, and it might naturally be expected that the removal of the troops from the ground on which they were attacked to a spot where the disease did not exist, would at once prevent the occurrence of other cases. Such would undoubtedly be the result were the disease simply epidemic and not contagious, but as regards cholera, widely different is the fact, which, more than once, I have had an opportunity of observing.

A corps or detachment of troops suffering under cholera, in consequence of encamping within the influence of a tainted atmosphere, cannot rid themselves of the disease for a considerable number of marches, though they may have removed far without this influence to a place

where no cholera prevails. Notwithstanding the change of locality the disease leaves the camp leisurely, and cases will continue to be propagated solely by infection. Having myself witnessed this more than once, I venture to say that an inquiry into the particulars of many other marches made by regiments, corps, or detachments, will tend to confirm the observation. To mention particular instances in which the cholera has been communicated from one individual to another through the medium of contagion, is necessarily attended with much difficulty. Generally the whole of a body of men are within the influence of the atmosphere which is charged with the virus, and all, therefore, may become susceptible of its effect. It is to be observed, however, that those individuals who are either accidentally or necessarily attendant on the persons affected are exceedingly liable to the complaint. Many medical officers have suffered, and, in my own case, I feel the utmost confidence of having experienced the attack through infection. During a march performed some months ago, at a time when cholera was not prevalent in that part of the country, an orderly havildar was suddenly attacked. Being solicitous for his recovery, I remained in the hospital several hours watching the progress of the

symptoms. At the moment of quitting the tent I felt a little nausea, and attributed it to the particular fetor of the interior. The following morning I was attacked with cholera, which proved nearly fatal. At this period no other case occurred. In the same detachment, a short time previous, it happened that a woman, who was very anxious for the safety of her child, slept in the hospital tent in which were several cholera cases. In the morning she was seized with cholera and she died. Besides this woman one of the three orderlies attendant on the sick, and who slept within the hospital, was seized. Thus it will be seen that of four individuals who chanced to sleep in an hospital containing the infection of cholera, two, or one-half of all so exposed, are attacked on the following morning. On the other hand, in the whole camp, consisting probably of 1,500 or 1,600 persons, not five cases had occurred. The native commissioned officers had the privilege of remaining in their own tents when suffering from sickness, and here I noted several other examples in which the disease appeared to have been extended through contagion among the families of these officers.

The contagious character of cholera seems to have been observed by the natives themselves,

and therefore it commonly happens, that the sick are avoided by those who are not called upon, as an act of duty, to attend. The village where cholera prevails, is usually evacuated for a short period, that the contagion may be destroyed. From all that I have observed, I cannot avoid looking upon the disease as contagious, although I am fully aware that the contrary opinion obtains. There are many objections probably, which will admit of being advanced in opposition to the evidence in favour of contagion; but facts should be allowed their due weight in the discussion, and in some measure, they should be permitted to supersede trivial objections. It should be remembered, moreover, that a certain predisposition of body, on the part of individuals, is necessary for the reception of the contagion of cholera, and of all other contagious diseases; a circumstance that explains how many individuals may be exposed, and only a few of the number happen to be infected.

Amongst the variety of medicines exhibited, there is not one I believe, which has not, at different times, both failed and succeeded, in the curative intention. It hence becomes a proper subject of inquiry, to ascertain how far the disease may be under the controul of any remedy;

or, uninterrupted and left to its own course, whether it may in any case be susceptible of a spontaneous cure? I am convinced that a number of cases, in the absence of all medical aid, do terminate otherwise than fatally, and occasionally under circumstances, which apparently are of the most unpromising aspect. I had occasion to remark this among some camp followers, who were attacked. They obstinately refused to submit to the treatment prescribed, and even without the use of spirituous liquors, they ultimately recovered. At the time, also, they were unavoidably exposed during the night, to a cold and humid atmosphere. One of these patients I noticed particularly, his situation was near my own tent, and I am assured that he neither had recourse to native medicines, nor would he accept of any matter prescribed. His circulation had become nearly extinct, his feet were cold, and a sheet was all that he could procure in the way of covering. While he remained in this unhappy condition, he fell into a sound and natural sleep, during which his pulse, and general circulation were restored, and when he awakened, his health was completely established, with the exception of excessive debility. From these, and other facts, I am of opinion, that the resources of

nature, in this, as in most diseases, are often competent to the preservation of life. It is difficult to say in what manner the beneficial effect is brought about, but it would appear that the restorative power of sleep* is the medium. So far as I recollect, every instance of cholera, in which sleep was induced, even for a few hours, subsequently recovered.

I do not mean to infer, because nature is occasionally competent to compass a cure, that the use of remedial agents is not absolutely necessary. The fact, however, will shew that caution is required in determining the precise effects, whether deleterious or salutary, of the medicines employed. In the early stage of the disease, and while the pulse is little diminished in strength, nothing certainly should forego the use of blood-letting. The extent to which bleeding should be carried, must necessarily be regulated by the effect it produces on the system generally, and the circulation in particular. The operation should be performed without delay, as in a short time the sinking of the pulse will shew that the period for the use of the only efficient remedy has passed. I have

* Here Mr. Chapman falls into an error similar to those which he afterwards so ably exposes. Sleep is evidently an *effect*, and not the cause of the cessation of the disease. J. K.

ventured to denominate blood-letting the only efficient remedy, and, if this observation be not supported, certain it is, that no other remedy can be said to be efficient. In the treatment of cholera, I shall ever consider the other remedies adopted, as auxiliaries at most, for it is the height of folly to suppose, that the mere extrication of a little bile from the liver, or perspiration from the skin, are the indications of cure in this rapid and fatal disease. While the malady continues, the patient passes nothing bearing the appearance of bile; it has therefore been inferred that an evacuation of bile, if procured, would be the means or cause of the patient's recovery, whereas the evacuation is merely an effect. It is not that a patient recovers because he has passed a little bile; but that bile has passed because he has recovered.

No. 37.* The 53d regiment, 900 strong, marched from Bangalore, the 11th of May, in a very high state of health and efficiency. The sick list contained only forty. Every other man was at his duty, and not one was left behind. They improved upon the march, and the sick

* W. Pollock, M.D., Fort St. George, July 1st 1820.

list decreased to thirty-five. On the 20th of the month, however, a violent case of cholera appeared in a man in the hospital, a convalescent from dysentery. He died early the ensuing morning. This was the commencement of a severe visitation, and the following is the course of its progress:—

20th of May,	near	Palamanair	1 Case.
21st	—	Ditto	1
22nd		Vencottaghirry Pettah..	1
23rd		Chittoor.....	1
24th		Ditto	2
25th		Newsingry Pettah	3
26th		Mullpaddy	6
27th		Arcot.....	8
28th		Cowry Pauk Fort.....	12
29th		Damul	12
30th		Carapettah.....	10
31st		Tirumungulum	6
1st of June		Amrambaidoo	2
2nd		Cowoor	1
23rd	at	Fort St. George	1
24th	—	Ditto	1
		Total....	68

During the first week of this visitation the epidemic was evidently not recognised by the unfortunate subjects of its attack, for they failed to report themselves until they were beyond

the reach of all treatment. The form in which the disease made its first appearance will perhaps account for this. In many of the cases, even of those which terminated fatally, there were neither evacuations nor cramps. In some of them, even to the last moment of their existence, there was not a complaint made of any kind, except an appalling consciousness of immediately approaching dissolution. In all of these cases, however, the most characteristic symptom of the malady was present; the circulation was arrested in every instance, and in addition, the patient had exactly the appearance of a body that had been drowned, and just taken out of the water.

The weather from the 22nd of May, the day that the 53rd descended into the Carnatic, was intensely hot, the thermometer ranging between 100 and 108 degrees, in the tents. During the afternoon of that day, there was a violent thunderstorm, which overthrew all the tents, and for an hour or two drenched every one in rain. Had the storm occurred before the epidemic, it would doubtless have been considered a powerful exciting cause of the disease, but the cholera commenced on the 20th, while we were yet in the table land of Mysore, and in a climate comparatively tem-

perate. From what I have seen of the epidemic, I am disposed to consider it as the operation of a peculiar morbid poison. Various causes, which have been assigned for its production, are nothing more than predisposing circumstances, that produce the susceptibility necessary to its display, as is well known to be the case in a host of other diseases. No atmospheric vicissitude will account for the appearance of the epidemic at this time, or why it did not appear among the troops of the 53rd regiment, in the year 1816, when they performed the same march, in the same month of the year, halted on the same encamping grounds, and were exposed, as far as I am capable of judging, to identically the same external circumstances, including, to its utmost extent, the whole range of atmospheric vicissitude.

SECTION III.

Medical Treatment of the Contagious Cholera founded on Experience and Reason.—Progress of the Disease exterior to Hindostan.—Laws of the Disease.—Evidence of the Existence of these Laws.—Quarantine.

If the reader have attentively perused the abstracts of the Indian Reports, he cannot fail to have observed a few facts of paramount interest which, by the concurrent testimony of a variety of witnesses, far apart, and ignorant, at the time, of each other's views, seem to have attained the rank of general facts. These general facts, in characterising the contagious cholera, shew that it is exceedingly fatal and rapid in its course—that it may exist in various degrees of severity in different individuals; and in various degrees of severity in different localities, and at different times in the same locality — and that, in the treatment pursued, bloodletting, calomel and laudanum, brandy, arrack,

and other spirits, and the application of moist or dry heat to the surface of the body, were the grand remedial agents.

A mere knowledge, however, of the principal symptoms of a disease, and a catalogue of the medicines which, in a multitude of instances, have effected its cure, will not be sufficient to qualify a physician to practise with either well-earned credit to himself, or advantage to his patient. The period in which a medicine should be administered, or its use discontinued or modified, is of the *first* importance. It is here, indeed, that the physician is thrown, to a greater or less extent, on the resources of his own judgment and experience; and unfortunate is the lot of that patient whose medical adviser happens to be deficient in either of these essential requisites.

The importance of ascertaining the period in which a patient should be submitted to the action of a remedy, and the period when the further continuance of that remedy would become useless or injurious, is well illustrated by what has occurred in the history of the continued fever which is common among the poorer classes of the people in England. With regard to the medical management of this fever, two opinions formerly obtained among many members of the profession.

One party, advocating the universal utility of stimulants, prescribed wine, &c. in almost every case; while the other party, pursuing a system in theory and practice exactly the reverse, maintained that blood-letting was a step almost indispensable in order to open the door to recovery. It is worthy of remark that the results of these antagonist systems, as far as they can be estimated in a record of cures and deaths appertaining to each, were nearly alike. This fact, though apparently singular and inexplicable, is perfectly natural. Both systems were equally erroneous, taken as a whole; but in their course of operation, much good as well as evil was undoubtedly produced. Patients who had laboured long under the disease, and in whom the vital power was nearly exhausted, would receive benefit from the stimulating plan; and those who had been recently attacked, and in whom the vital power was little impaired, and the action of the blood-vessels rather high, would receive benefit from depletion. When either plan of treatment, however, was resorted to indiscriminately, it would often be productive of the most injurious consequences.

Yet the errors of former years should not lead to the supposition that their advocates were behind ourselves in mental penetration, and the desire to

discover the simple truth. These errors were less the faults of the individuals than of the times in which these individuals formed their opinions; and it would be unphilosophical and very unfair to weigh their merits or defects unless in connexion with the comparatively obscure light of their day and generation.

In the present day, the experience of all rational practitioners demonstrates that the medical treatment of fever must be adapted to the peculiarity of the existing symptoms in every case. At one period of the attack, the prevailing symptoms may require blood-letting, while at another period, and in the same individual, wine and other stimulants may be absolutely necessary. Each stage of the complaint will have its appropriate remedy. Considerable as the professional skill must be to determine the proper quality and quantity of this remedy, there is equal if not greater skill required to determine when the use of all medicine should be intermitted; to say when the patient should be left for a time, under careful observation, to the curative efforts of nature alone.

As a continued fever usually takes from ten to twenty days to run through its course, a long period is afforded to distinguish the different

stages of the disease, and to select and apply the remedial measures best suited to each particular stage; but in some other maladies, the duration of the attack is extraordinarily short, and consequently it is more difficult to recognize and discriminate the different stages. The contagious cholera, for example, if uncontrolled by the aid of medicine, generally reduces its victim in a few hours nearly to a state of vital exhaustion: the rapid changes, therefore, which the symptoms undergo, often leave the astonished practitioner prescribing at random.

It appears to us that the progress hitherto made in distinguishing the individual stages of cholera, and their appropriate treatment, has been productive of little practical advantage. Many practitioners, certainly, have shewn in the management of their patients, a degree of discrimination worthy of the highest encomium, and several of these may be recognized in the abstracts of the Indian Reports; but their success did not lead to the formation of rules for the guidance of others. There seems to have been no system generally followed or laid down for the adaptation of the remedies to the existing symptoms and the state of the patient's strength. This unfortunate defect was noticed in India: it was thought, however,

that the crowds of people affected about the same period, and to whom immediate advice was necessary, precluded the possibility of making at all times the proper distinctions. Surgeon Wight, in his Report* to the Medical Board of Madras, observes, "On the general principles of the treatment of cholera, I have little to say. Most of the remedies which I have employed, have been tried and recommended before. From the experience acquired in the present epidemic, I can neither add to, nor detract from former recommendations. They were uncommonly successful in some apparently hopeless cases, and, on the contrary, failed completely in other cases where the circumstances appeared very favourable. The causes of these differences are often difficult to ascertain, even when the circumstances of the patients have admitted of their being minutely investigated during life, and their bodies examined after death; but much more so when neither of these can be done.

"In favourable circumstances for medical inquiry, a minute examination into the patient's previous history and ailings often point out the cause of these differences; but in a regimental

* Dated Samulcottah, March 20, 1822.

hospital, and particularly a native one, during the ravages of a rapidly fatal epidemic disease, such inquiries can seldom be made. In the hurry and confusion necessarily attendant on these occasions, the leading symptoms are usually all that are inquired about to form a diagnosis. The general likeness of the disease being established, the medicines that have been found useful are prescribed without attending to the minute circumstances of the case on which an accurate diagnosis (distinction) can be formed. Should it so happen that the constitutions, &c. are alike, or nearly so, it is probable that they will all recover; but should it so happen that one or several cases occur in which the circumstances are very different from the above, it is more than probable that they will all fall victims under the same treatment that saved the others. This kind of practice is, I believe, called treating a *name* and not the disease before us."

Mr. Wight's observations exhibit the candour and penetration which are the fruits of an intelligent and honourable mind, but we cannot agree with him as to the difficulty of making the proper distinctions, or the summary manner of getting rid of it by treating every patient alike. In our opinion, the difficulty is rather to be attributed to the hurry and confusion which beset the

practitioner in the treatment of this rapid disease, than to any want of distinctive marks in the stages of the malady itself. Hereafter we shall have an opportunity of shewing the foundation on which this opinion stands. Were the distinctions, however, impracticable, we would think it more safe for the physician to rest satisfied with the application of gentle remedies that could do no harm, than to resort to those powerful means the chance-action of which would probably produce a greater proportion of mischief than of benefit. It is scarcely necessary to add that a physician should never permit a professional scene (though of the most distressing nature) to disturb or cloud his medical judgment.

By pursuing *names* instead of principles, many additional mistakes have been committed. Some of these are very apparent in the heterogenous opinions which have been recorded of the medical virtue of the different forms of moist heat when applied in the treatment of cholera. Several physicians limit their encomiums to the warm-bath; others extol the vapour-bath to the exclusion of the former; while, latterly, a third authority* maintains that a hemp-seed poultice

* Warsaw Committee of Health.

is better than either. A grain of reflection might have convinced the three parties that they were divided on the merits of a name alone. The medical virtue is the same in all, and it consists simply in the application of heat and moisture to the surface of the body. The question to be determined is the effect which these remedies are, individually, capable of producing, in a given time, upon the patient, and when there is a choice at command, we should select the strongest one of the number. Now, the warm-bath is by far the most effective and convenient agent of the class to which it belongs; it communicates heat more rapidly to the body than either the vapour-bath or the poultice, and the relaxing power of its moisture is commensurate. It is probable that a five-minutes' exposure in the warm-bath will be more than equivalent to fifteen minutes in the vapour-bath. The superior rapidity and power of the warm-bath, therefore, should obtain it a preference in the treatment of the stages of cholera where the use of moist heat is indicated; but we must also remember that in consequence of its superior power, a greater degree of caution is necessary, in order to guard against its being too long continued or misapplied

The misapplication of the remedial measures

has been the source of extraordinary confusion and contradictory testimony. Several remedies, on which the strongest dependence is to be placed in the management of cholera, have fallen repeatedly into temporary disgrace, from their having been prescribed in stages of the disease when their use was altogether improper. In this way, besides the warm-bath, we often find that laudanum in large doses, after having had its virtues attested by a host of witnesses, is characterised by some persons as totally inert or deleterious. The same has been said of calomel, and indeed of all the efficient resources of the medical art which have been extensively tried.

The character of venesection has been libelled in a peculiar manner. At an early period, during the progress of this singular malady, the blood deserts the superficial vessels of the body, for the deep-seated and internal parts, and even before the period has arrived in which a loss of blood could prove injurious to the patient, not a drop of that fluid can in general be procured, after the opening of both veins and arteries. In ninety-nine instances out of a hundred, where patients are said to have died "despite of blood-letting," it will appear, upon examination, either that no blood flowed from the incised veins, or that it

came away in drops, or in a small broken stream rarely exceeding a few ounces in quantity. On the contrary, where blood was freely obtained to the extent of twenty or thirty ounces, and where the depletion was followed by proper auxiliaries, the patients have usually recovered.

That the success of blood-letting did not depend upon the disease having assumed a mild form, a circumstance which raised some trifling medicines to surreptitious notoriety, is apparent in the advantage derived from its use in the centre division of the grand army, where the cholera was more extensively destructive than at any previous or after-period in Hindostan, admitting of a fair comparison. In the centre division, (says the Bengal Report,) the disease was seen on the largest scale, and each remedy was brought to the full test of experience by numerous and repeated trials. The disorder first fell upon the camp in an insidious manner, and no suspicion was entertained of the dreadfully epidemic form which it was soon to assume. The cases coming under observation were comparatively mild, and were treated successfully with calomel, opium and brandy, in moderate doses, at regular periods. But as the symptoms increased in intensity, this plan frequently failed, and it became necessary to

greatly augment the quantities of those medicines. At length the largest doses of stimulants proved useless, and the miserable sufferers were cut off in spite of every means, after an hour or two of illness. The bodies of some of the dhooly bearers and native details were then opened, and such appearances discovered, as seemed to warrant a new mode of treatment. The lancet was accordingly had recourse to; at this period, however, the patients were almost all natives, seen at an advanced period of the disease, and in whom universal coldness and collapse had usually taken place. It was rarely found, therefore, that the blood would flow, and the practice was soon abandoned in despair. Then brandy and other cordials were freely given, to raise the pulse and remove debility, and large doses of laudanum to relieve spasms, but still almost all died.

While the practice was in this unsettled state, and the medical officers were in extreme suspense, as to the proper means of resisting the disease, the European portion of the army began to be attacked. About five o'clock, A.M. of the 14th of November, two Europeans belonging to the flank battalion were admitted into hospital. They had the disease in a violent shape, and the spasms especially were dreadful. A scruple dose

of calomel, and one hundred drops of laudanum in a glass of brandy and water, were given to each, and repeated at intervals during the day. No relief, however, succeeded to the treatment. The patients continued in horrible torture and died before eight o'clock at night. During the course of the same evening four men of the same corps were admitted together. It was resolved, that bleeding should be tried in all. From the first two, no blood could be obtained, but from the second it came freely, and as instant relief followed, thirty ounces of blood were taken from both. Next morning the patients who had lost blood were out of danger, while of the two from whom no blood could be obtained, one had died, and the other expired before noon.

Emboldened by the successful result of this trial, the medical officers of the flank battalion endeavoured afterwards to bleed every patient, and, with one solitary exception, no person died from whom twenty-four ounces of blood were obtained. If the patients were seen within two or three hours from the beginning of the attack, the practice usually succeeded ; but at a later stage when the pulse was gone, the skin cold, and the nails blue, a flow of blood could not be induced by any means. Sometimes, even in the com-

mencement of the attack, the extreme violence of the symptoms rendered the attempt ineffectual.

Thus far we have endeavoured to vindicate the character of blood-letting, and to shew the manner in which the other efficient remedies have occasionally and undeservedly lost the confidence of the profession. We shall now proceed to the consideration of a discriminative system of medical management; and in the first place, it will be proper to begin with a short description of the disease itself.

The course which the attack of acute cholera in general pursues may be divided, for the purpose of medical treatment, into two types or varieties—one, the *protracted* or severe type; the other, the *rapid* or violent type.

DISCRIMINATIVE TREATMENT OF ACUTE CHOLERA.

Protracted Type.—The protracted type consists of two stages; and in order that the practitioner may easily recognise these stages respectively when he meets them, we shall enumerate a few of their symptoms beyond those of practical value.

First Stage.—The patient complains of feeling of anxiety, or of uneasiness at the pit of the stomach. After some time nausea supervenes, and the uneasiness changes into a feeling of heat or pain. To these symptoms succeed vomiting and purging, and prostration of strength. The evacuations, at first, consist of the common contents of the alimentary canal; afterwards of a fluid like rice-water. Occasional cramps are felt in the limbs. The pulse is small and rather quick. The skin feels a little cold, and the temperature is gradually decreasing. The countenance of the patient is somewhat shrunk, and the features appear sharper than natural.

If the disease be left to itself, or if it continue to advance in spite of the remedies that may have

been used, the symptoms increase in severity, and the patient comes to suffer from

Violent cramps in the upper and lower limbs, and at times in the muscles of the chest and belly. The cramps, in general, are not constant; they recur at short intervals in paroxysms. The vomiting and purging are severe. The coldness of the skin has increased much; it feels moist, and is of a bluish colour about the face, hands and feet. The palms and soles of the latter appear corrugated, as if they had been steeped in water. The pulse is barely, or not at all, to be detected in the wrists and temples. The countenance is ghastly, and expressive of great anxiety. There is distressing thirst, and burning heat or pain in the region of the stomach or bowels.

If the disease be still uncontrolled, it will pass into the second stage.

Second Stage.—Under the increasing debility the vomiting, purging, and cramps are subsiding or have disappeared. The patient lies in a state of helpless exhaustion, and is almost incapable of making the slightest movement. He is apparently insensible, but as his senses remain unimpaired to the last, he may be roused to say "Yes" or "no." The pulse

is gone, and even the action of the heart is extremely feeble. The surface of the body is deadly cold. The breathing is oppressed, or scarcely perceptible, and the countenance is quite cadaverous.

This short description contains all that appears necessary to form a general picture of the acute symptoms in protracted cholera. The treatment, also, may be greatly simplified by the omission, at the present time, of the name of every remedy of secondary power. A course which shall be adopted.

In the treatment of the first stage, the primary object of the physician will be to allay the cramps, the vomiting, and the purging. To carry this indication into effect, he should not rest content with the application of any single remedy; it will be accomplished most effectually and rapidly by a combination of measures. The warm-bath, blood-letting, and a large dose of calomel and laudanum are to be immediately prescribed. If the bath be ready prepared, the patient should be placed in it, and during immersion he may take the dose of medicine and have the blood-letting performed. One remedy, however, should never wait upon another; the first at hand should be administered first. Their influence upon the symptoms is to be vigilantly watched. As soon as the cramps are sub-

dued, or have received a decided check, the patient, with all possible expedition, should be removed from the bath and placed between *dry* heated blankets. Dry warmth should be further afforded by surrounding his body and limbs with bags of heated sand.* If the cramps, &c. do not return, the previous remedies are not to be repeated. New measures are now required to remove debility and to excite the natural action of the bowels.

The treatment of the *second* stage will be very different from that of the preceding. During the active progress of the first stage, the vital power is considerable, and there is high spasmodic action in various parts of the body, which enable the patient to bear with advantage the loss of blood and the sedative effects of large doses of laudanum; but in the second stage, the patient is in a state of *real* exhaustion, and would consequently sink under the use of these strong measures. Even the warm-bath is dangerous to life at this period, and its use must therefore be avoided.

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* Here *dry heat,* be it remembered, is the remedy, and not the sand which contains it. On this principle, bottles of hot water, rolled in flannel, have been employed, and also hot ashes, bran, oatmeal, &c. &c. A more efficient mode of applying dry heat than any of these may suggest itself, but occasionally, to prevent loss of time, we must take the first that offers.

In the second stage there are two principal indications for simultaneous adoption—1st, To remove the deadly coldness of the body; 2nd, To remove the great debility. The coldness must be attacked by the application of *dry* heat. The bags of hot sand should be assiduously applied to every part of the body, and, in addition, heated blankets above and below the patient. For the removal of the excessive debility, some of the most powerful stimulants must be had recourse to, as ether, brandy, or other spirits, hartshorn, &c. These remedies are to be continued until the patient finally sinks under the disease, or until reaction is fairly come round, after which they may be gradually dispensed with.

When called to see a patient who apparently is labouring under most of the symptoms of the second stage, we should always inquire into the history of the case before we prescribe, for without this information, fatal mistakes may be often committed. If the disease have been established a few hours, or if the existing symptoms have been preceded by the usual phenomena of severe cramps, vomiting, and purging of some duration, we are entitled to conclude that the patient is really in the second stage, and that he should be treated accordingly. But if the symptoms have commenced in this severe form, and

that only a short time previous to our arrival, we must be guided in our remedial proceedings by the rules suited to the treatment of the *rapid type* of cholera, a variety of the disease to be presently described.

Rapid Type.—In many instances the attack of cholera commences with very aggravated symptoms: the patient falls suddenly down in a state of extreme weakness, and perhaps temporary insensibility, and the energies of the constitution are so much oppressed by the influence of the morbific poison, that there may be little or no visible attempt at reaction. The pulse almost instantly, or in an exceedingly short period, disappears at the wrist, and the heat of the body rapidly declines. In these cases, cramps, vomiting, and purging are either completely absent, or an attempt to establish these symptoms is only evinced in slight spasms, and the occurrence of one or two nearly passive evacuations. The violence of the disease, however, in this type, and the uniform course which the symptoms are inclined to pursue until death closes the scene, should not deter us from the application of a discriminative method of medical treatment. The acute symptoms of the rapid type may be divided into two stages:—One, of *apparent* debility; the other, of *real* debility.

The chief remedial measure is blood-letting, and here its use is founded upon the fact, that, for a certain space of time after the commencement of the attack, the resources of the constitution are not to be measured by the external symptoms. Apparently the patient is in a state of hopeless debility (and this will generally prove to be the case if he is left to the efforts of nature alone), but when properly assisted by art, the constitution is often enabled to rally, and eventually to recover from the shock. The time, however, in which this medical service may be performed with the greatest hope of success, is unfortunately extremely limited, in some cases not exceeding many minutes after the patient has been seized.

If the practitioner arrive before the blood has deserted the superficial vessels, blood-letting should be performed to the extent of twenty or thirty ounces, in an adult. Then other auxiliary measures will be required. Of these, nothing should supersede the immediate and continued application of dry heat to the surface of the body. The value of this remedy is incalculable, and it has the advantage of being applicable at any period, whereas the opportunity for the abstraction of blood may be soon irrecoverably lost. Internal stimu-

lants, as ether, hartshorn, &c. should be also administered in order to expedite the establishment of reaction. If the second stage, that of real debility, have commenced before the patient is seen, the treatment will consist of dry heat and internal stimulants, without blood-letting.

In many cases of the rapid type, a complete inversion of the train of symptoms common to the protracted variety of cholera has been observed during the progress of reaction. As a patient recovers from the state of stupefaction or apparent exhaustion into which he was hastily precipitated, and as he gradually gathers strength, it may happen that cramps, vomiting, and purging will then be developed for the first time. This proves, as it were, by analytic evidence, that cramps indicate a comparatively mild form of the disease. If the cramps become severe under this new arrangement of the morbid phenomena, we must resort to the curative means hitherto recommended for the spasmodic stage and its consequences.

The discriminative principles now laid before the public, are those which we found the most successful in the treatment of the cases of cholera that came under our personal direction in Calcutta. Our suspicion of the accuracy of the

practice then generally pursued was first excited by the contradictory statements made as to the value of the various remedies, and by the equable mortality which had resulted after numerous trials, though of the most opposite character. The justness of this suspicion was no longer a matter of doubt when we became practically acquainted with the disease. Patients suffering from cholera having come under our controul, we followed in their treatment the opinions of persons of experience in the country, and who seemed to be competent authorities. The result, however, was by no means encouraging. The medicines that appeared to be serviceable in some cases, appeared to be detrimental in others, and in a few they undoubtedly hastened the catastrophe. With these facts before our eyes, one of two conclusions was forced upon our judgment—either that these medicines were altogether injurious, and that some patients had recovered notwithstanding their bad effects; or that they had been prescribed in the unfortunate cases during a stage of the complaint when their use was decidedly improper.

To determine on which side of the question probability rested, we applied to the Secretary of the Medical Board in Calcutta for information regarding the details of the practice that had been

followed in the Indian army. The request was immediately granted; and in addition to much verbal information on the subject, we obtained the perusal of several documents. The testimony afforded in favour of blood-letting, calomel, laudanum, and the application of moist and dry heat, in the treatment of cholera, was overwhelming, and no doubt remained upon our mind that these were the remedies chiefly worthy of confidence. But with respect to the time in which these remedies should be administered, or their use discontinued, the practice seemed to have been often capricious, and certainly far removed from scientific precision.

It often happens that the errors and excellencies of our predecessors in the field of research afford an equal measure of instruction. In this case we endeavoured to turn both to advantage.

In the abstracts of the Indian Reports, instances may be observed where the use of the warm-bath in the second stages of acute cholera seemed to hasten the death of the patients. Instances of a similar character might be multiplied by referring to facts extraneous to this volume, but a few will be sufficient for our present purpose. That moist heat should have a dangerous influence on patients in a state of *real* debility, appears very

natural when it is recollected that even persons in health will faint after long immersion in a bath at a high temperature. In the treatment of cholera, the temperature of the bath was generally above 100 degrees, and frequently it was raised to 110 degrees in the hope that this strong heat might counteract the rapid loss of the natural warmth of the body. In our opinion the warm-bath, or any other form of moist heat, should never be used in acute cholera, unless at the commencement of, or during the prevalence of severe spasmodic symptoms.

Numerous as the patients certainly were who had their chance of recovery diminished by the injudicious application, or continuance of the warm-bath, a still greater number must have suffered from the improper use of laudanum. This powerful narcotic was frequently prescribed in large quantities in every stage of the disease. The people, moreover, independent of medical advice, resorted to the free administration of brandy and laudanum, as a sort of panacea, or universal specific. When prescribed early in the spasmodic stages of cholera, it is probable that drachm-doses of laudanum were generally beneficial; but their bad effects in the stages of debility may be estimated by what might be expected to follow their administration in the last stage of a lingering

typhus. Large doses of laudanum, or of calomel, appear serviceable only in the symptoms of the first stage of the protracted type.

When a powerful remedial agent attains a high reputation in the treatment of a violent malady, a proportional degree of caution is necessary to guard against its abuse. The influence, then, of blood-letting under certain contingencies, demands a minute and discriminative consideration. That, in the stages of cholera where a loss of blood would prove injurious, no blood will flow from the incised veins or arteries is true as a general rule; but occasionally an exception to this rule may be encountered, and we should be prepared, if possible, to meet the exception. It appears to us that—

Blood-letting, were it practicable, should be avoided,

1st, Towards the termination of the first stage of the protracted type;

2d, During the whole of the second stage;

3d, In the rapid type during the period of real debility.

Indirectly attempts at blood-letting have been more injurious than directly. As the report commonly obtained that every patient from whom blood could be freely procured was almost sure of

recovery, the other remedies were partially thrown into the shade. The general fact being known, without the qualifying circumstances, much time was often spent in fruitless attempts at blood-letting which ought to have been devoted to the steady application of the auxiliaries.

The foregoing strictures have been confined to the remedies that came under our personal observation. The partial success that attended their administration at first, when we paid little attention comparatively to the stage and type of the disease was strongly contrasted to the effects which followed their discriminative use. In the former instance the mortality amounted to the proportion of one in four, in the latter the proportion was diminished as low as one in nine. Both sets of cases occurred in the same inroad, and after having made every reasonable allowance for fluctuations in the intensity of the disease, this discrepancy could only be accounted for satisfactorily by admitting that an improvement had taken place in the method of cure.

There is no disease more true to its general characters than acute cholera. The description of the symptoms as they appeared in India will apply to their course in every part of Asia and in the islands; yet it is very difficult to institute a legi-

timate comparison between any two inroads in order to discover the relative value of their medical treatment. For, although the disease be true to itself, the duration of its individual attacks, under different inroads, and in different persons during the same inroad, is extremely variable. Two patients seized about the same moment may be in opposite states of the malady, one in the first stage, the other in the second—at the end of a short period, when they come to be seen by the physician. The event in this way will be strongly influenced by the constitutions of the patients, and their degree of predisposition to the attack. A knowledge of these circumstances may preserve us from drawing hasty conclusions.

The rules given for the management of the protracted type of cholera were those which we latterly followed in the cases of this variety. The principles were rigidly adhered to, although with different patients different means were unavoidably adopted to compass our intentions. In several instances it was impossible to procure a warm-bath at the time this remedy was prescribed; or in some, perhaps, during the whole of the spasmodic stage, when its use would have been proper: instead, therefore, of the bath, or while it was preparing, moist heat was applied by dipping pieces of blankets into hot

water, and folding them around the limbs and body of the patient. As soon as the spasmodic symptoms were subdued, or their violence completely abated, and not before, we had recourse to dry heat and such internal stimulants as ether, hot brandy and water, &c.

Blood-letting, the opportunity for performing which is so precarious, is not indispensable to the recovery of a number of patients who are subjected to cholera in either type ; but patients who have been freely bled, in general more rapidly recover than those who have not. The blood-letting appears to cut short the attack in a decided manner, and afterwards, with the establishment of reaction, the secretions which had been suppressed, the heat of skin, the pulse, and the appearance of the patient gradually return to their healthy standard. In cases where recovery is slow, and more particularly in such as have not been bled, reaction is occasionally the forerunner of febrile symptoms and derangements of the bowels, which impede the progress of the cure, and require to be treated on the general principles of medicine.

One source of failure in the treatment of cholera remains to be noticed. When a person is seized, something more than the advice and as-

sistance of a competent physician is necessary, even at an early period of the attack, to afford a moderate hope of success. The best advice will be bestowed in vain unless it is carried fully into effect by the people who are in attendance upon the sick for that purpose. Any neglect in the administration of the internal remedies, or in the application of heat, may prove fatal to the patient. As an example of this, and also of the benefit derived from the common remedies without blood-letting, we shall give a case that happened among the sailors in the harbour of Calcutta.

The subject of it was a young Frenchman serving on board an English vessel. Having been suddenly seized about the hour of breakfast, with great exhaustion and the other symptoms of cholera in the rapid type, a messenger was despatched for medical aid. When we arrived, fifteen or twenty minutes afterwards, the stage for blood-letting had passed. The patient seemed to be in a state of stupefaction ; his eyes had a dull vague appearance, and he lay apparently unable to move a muscle, and apparently unconscious of any thing around him, or of his own situation. By a shake, however, and a smart interrogatory, he could be roused to make a reply ; but he uttered no complaint, and only wished to be left to die undisturbed.

Dry heat was assiduously applied to his body and limbs; and friction of the skin was attempted by communicating a sliding motion to the heated blankets. Internally, stimulants were administered at stated intervals, consisting of ether, hot brandy and water, and aromatics. In the course of a few hours a slight improvement was visible in the symptoms. He could be roused with less difficulty, and his breathing was less feeble than before; the symptoms continued slowly, yet steadily, to abate, and in the evening he was so far recovered from the shock that we began to entertain strong hopes of his eventual recovery. A purgative was now prescribed, and arrangements were made that through the night a man should unremittingly attend to the application of the dry heat, and, during the waking hours of the patient, to the occasional administration of a little hot brandy and water.

Next morning, at the visit, we found our patient on deck, stretched along a temporary bench, and screened from the sun by a sail supported in the form of a tent. His comrades said they had brought him up for the benefit of fresh air, as the place below was close and suffocating. The extreme coldness of the skin, which had been partially removed by the artificial warmth and the use

of the internal stimulants, had again returned, and the debility had also increased; but his mind was not so inactive as on the previous day. Being asked respecting his feelings, he readily complained of distressing thirst, and a sensation of sinking. The change for the worse excited our suspicion that the remedial measures had not been carried fully into effect through the night, and this suspicion was confirmed by the information which, upon inquiry, we obtained from the person who acted as mate to the vessel. The mate said that during the day he took heed that every care should be bestowed, but at night, when the management of the case was solely left to the men in the forecastle, he feared that little attention had been paid to his orders. "The men," he said, "had a strong prejudice against the patient *because* he was a Frenchman, and it was a vain thing to oppose reason to the prejudices of seamen." As there was no help for the past, we adopted measures for the future The heat and the medicines were to be administered throughout the day, and, as the purgative had not operated, a few grains of calomel were prescribed. It was also projected, in the event of the patient rallying, that some trust-worthy individual should be procured to attend upon him at night.

When we saw the patient again in our evening visit he was lying in his "berth," and the disease had become so aggravated that the case was evidently hopeless. His mind, however, was perfectly correct, and he ascribed the change in the symptoms to the influence of a wetting which he had received while on deck, about the middle of the day. It appeared that the heartless wretches, calling themselves "British sailors," had been slow to remove the poor fellow during the commencement of a heavy shower. His sheltering sail and blankets, therefore, were in a few seconds penetrated by the tropical rain, and a state of collapse had succeeded from which he never recovered.

Before closing our remarks on the treatment of cholera, we would again observe, to impress it the more deeply on the memory of the reader, that we have as yet abstained from the consideration of every remedy that has not been submitted to the test of our own experience. Some medicines, indeed, of which we have had experience, as oil of peppermint, and other aromatic stimulants, are also passed over, because they are capable of doing neither much good nor harm in any case, and therefore their use may be safely left to the discretion of any practitioner.

We are not, however, inclined to say that our catalogue of efficient remedies contains all that we might think ourselves justified in prescribing in a wider field of practice. In the hope of shortening the several stages, and guided by discriminative principles, many strong medicines might be added to the list, and in this way their virtues might be brought to a fair trial: but in making such trials, it should never be forgotten that acute cholera consists of different stages, and that the medicines which assist in performing a cure in one stage of the malady, may as certainly assist in destroying the patient if administered in another. During the periods suited to each, the practitioner, under proper precautions, might try the powers of almost any substance of the sedative or stimulating class, as bismuth, cajeput oil, phosphorus, &c. The promiscuous exhibition, however, of these powerful agents would probably destroy one half of the patients submitted to their action.

Mr. Preston, assistant surgeon on the Madras establishment, has given an account* of the influence of phosphorus in the stages of real debility.

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* Communicated to the Medical and Physical Society of Calcutta.

After noticing the poisonous character of this body, and the caution to be observed in its administration, he proceeds to state, that the cholera having appeared in a large detachment of Europeans, proceeding to Nagpore, he was requested by the medical officer in charge, to accompany him in visiting a patient who had been labouring several hours under the disease. When they arrived, the man seemed to be sinking. Considering the case altogether hopeless, the phosphorus was had recourse to, and two grains in the form of a pill were exhibited. After a short period, the patient felt a strong sensation of heat in his stomach, and as no unfavourable symptom arose from the first dose, a second containing the same quantity was repeated at the end of two or three hours. The sensation of heat increased, the forehead became covered with a warm perspiration, and the man eventually recovered. A second case was treated in a similar way, and with equal success. In a third the phosphorus failed; but it is said that the man was dying at the time the remedy was administered. He had just arrived at the ground after having been exposed for some hours in a sick cart to both wet and cold.

Mr. Preston entertains a very favourable opinion of phosphorus in the stages of real debility.

It is an exceedingly strong stimulant, and its dose must be cautiously regulated.

Emetics composed of tartrite of antimony, or of sulphate of zinc, or of salt and water, are said to have been useful in some cases of cholera. We have never seen emetics tried, but we can conceive, at the very commencement of the disease, and previous to the occurrence of aggravated symptoms, that the shock produced by artificial vomiting, might at times succeed in breaking the chain of morbid action, in the same way as an early emetic will occasionally obviate an attack of common fever. When the symptoms, however, have become fully developed, the exhibition of emetics is perhaps attended with little benefit.

Some practitioners approve of the application of blisters to the region of the stomach. The cantharides blister being too slow to be available, nitric or sulphuric acid has been substituted to produce a hasty destruction of the skin. The advocates of this practice say, that it relieves the vomiting and the irritability of the stomach; as these symptoms, however, soon yield to the bath, laudanum, &c., and as the patient ought not to suffer unnecessary pain, we cannot for this purpose recommend such severe measures. Spirit-

uous embrocations, also, have been applied, but they are evidently injurious. These fluids rapidly evaporate, and consequently they will increase the coldness of the body, an effect, above all others, to be avoided.

The curative property assigned to magnesia is not countenanced in this epistolary extract,* "I have heard from some of my friends of the 4th regiment of Native Infantry, that they suffered much from the cholera. On the 1st and 2nd of June they halted at Luggenpett, where the disease first began, though there was no sign of it in the village. On the 6th, they were at Tackmutta, and the camp was a scene of lamentation. The milk and magnesia had a fair trial, and not a man was cured by it. Brandy, calomel, and laudanum were afterwards resorted to, and they appear, by the account I have before me, to have succeeded in seven cases out of ten." Although magnesia be totally incompetent to the cure, or even the retardation of cholera, there is evidence to shew that a drink, containing a small quantity, has proved very grateful to the feelings of some patients. Potash probably would answer the same end. We were informed by

* Asiatic Journal, Vol. XIII. 1822.

Captain Dick, chief secretary to government at Mauritius, that during the prevalence of cholera in the island, a slave* accidentally drank some water containing wood-ashes, and the beneficial effect which followed, led to their frequent exhibition. These testimonials in favour of alkaline fluids, are rivalled by the encomiums which Mr. Annesley has bestowed on acidulated drinks. He alleges that water containing a little nitric acid forms the very best beverage.

Castor oil, either in the simple form, or in combination with laudanum, has been substituted for calomel, in the treatment of many cases, and a favourable opinion has been recorded of its efficacy. Medical men in Europe are greatly prejudiced against large doses of calomel, and on this account chiefly, it might be well to give the castor oil a further trial; but we must register it as our conviction, that this is the only experimental change which may be hazarded, in the use of what we have called the efficient remedies. In the present state of our knowledge, new medicines should be prescribed secondarily, and considered merely as assistant to the influence of

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* On the estate of Monsieur J. B. Riviere, Commandant of Plains Wilhems district.

blood-letting, laudanum, calomel, the common stimulants, and moist or dry heat, as the stage and type of the malady may require.

From all that has been said, it will be apparent that *no single* remedial agent has yet been discovered capable of effecting the cure of cholera, when once the symptoms are fairly established. Neither do we entertain sanguine hopes that a *specific* will be discovered hereafter. In this statement, however, there is nothing that should lead to professional opprobrium, or to public despair. Most maladies with which we are acquainted, are only to be subdued by a variety of remedies—prescribed either simultaneously or in succession—at short, or at distant intervals. Those which we have recommended for cholera will prove eminently successful whenever the patient is submitted to their action early in *the first stage*, and under other circumstances it would be unjust to ascribe the issue of the case to any weakness in the remedial agents. If a person seized with extensive inflammation of the lungs, delayed applying for advice, until the disease had advanced into the last stage, his death would not implicate the skill of the physician. The same conclusion may be extended to typhus fever, and indeed to every violent malady. But as the

majority of these affections usually take several days to attain their acmé of virulence, the danger incurred by a temporary delay is in a manner trifling, compared to what it would be in a case of the contagious cholera. The cholera, even in the protracted type, frequently runs through its stages in the lapse of a few hours, and therefore, to ensure a successful result in its treatment, the resources of physic must be applied, and modified with still greater rapidity. In those cases where death takes place instantaneously, or in a few minutes after the accession, the catastrophe should be no more ascribed to the inefficiency of the medical art than the casualties that occur from lightning or drowning.

There have been then three causes in operation to account for the dreadful mortality which has in general attended the progress of cholera. Two of these—namely, instant death, and death in consequence of delay in obtaining medical advice, were beyond the controul of the physician; the third cause is within his controul, and it originates in the inert or promiscuous treatment of the disease. To oppose and destroy the third cause, has been our earnest object.

MAP
of some of the Principal Places in
ASIA & EUROPE,
visited by the
Contagious Cholera,
from August 1817, to September 1831.
Note. For the Localities in Hindostan, see First Map.
ICELAND
NORWAY
SWEDEN
FINLAND
RUSSIA
Archangel June 1831
Petersburg June 29 1831
Moscow Sept 1830
Riga May 1831
Mitau June
Libau May
Memel June
Dantzic May 1831
Berlin Aug 31 1831
Warsaw April 1832
Lemberg May 1832
Kiow Oct 1830
Brody May 1831
Vienna April 14 1831
Jassy June 1831
Bucharest July 1831
Odessa
Poltava Oct 30 1830
Tambow Sept 1830
Penza Aug 1830
Saratow Oct 1830
Samara Oct 1830
Orenburg Sep 1829
Astracan July 20 1830
Caucasus
Tiflis
Erzeroum 1831
Diarbekir 1832
Mosul 1832
Bagdad 1831
Teheran 1832 & 1829
Yezd Sep 1821
Ispahan Oct 1821
Shiraz Sep 1821
Bushear Aug 1821
Gombroon
Bassora 1831
Bahrein 1821
Muscat June 1821
Antioch June 1823
Aleppo
Beyrout 1823
Jerusalem Sep 12 1830
Nischnei Novgorod Sept 1830
Vereyovod Aug 1830
Kasan Oct 1830
Simbirsk Oct 1830
Ufa
Jaik
Gouriefi
Gouriefi
Gouriefi

PROGRESS OF THE CHOLERA EXTERIOR TO HINDOSTAN.

Hitherto the geographical progress of cholera has been considered only in connexion with Hindostan, it will therefore be proper to give in this place a very brief sketch of the route which the pestilence described exterior to that country, in Asia, Europe, and the Islands.

Soon after the cholera had originated in Jessore it spread along the neighbouring rivers, and committed much havock among the shipping of the Hooghly. In 1818, a severe inroad was experienced in some of the Company's vessels anchored at Saugor island. The first fatal case occurred the 7th of September, on board the Warren Hastings, and this was the forerunner of several others. On the morning of the 10th, a

seaman was attacked, and he died in a few hours. During the afternoon of the day, a party went ashore to bury the corpse. Having performed that melancholy duty, they returned to the boat, and to their astonishment, found the man who had been left in charge, convulsed in its bottom. He died at four o'clock next morning. Then the boatswain was seized. He lingered to the 15th, when he sunk under debility. In the course of a few days, eight additional persons were attacked. The disease, however, was less severe in these patients, and they all recovered, after the use of blood-letting, anodynes, and calomel. Fewer cases happened on board of the other vessels at the anchorage, and the General Hewitt completely escaped, in consequence, it is said, of the great care that was taken to preserve the men from the predisposing circumstances.

From the Bay of Bengal, the cholera extended eastward along the coast of the Asiatic continent, and through the islands of the Indian Ocean, to the farther boundaries of China, and to Timor, near New Holland. In the year 1818, the malady had appeared in Arracan; in 1819, in Penang, Bankok, the Island of Java, &c. Canton was invaded during October, 1820, and in the succeeding year the contagion entered Pekin. By

November, 1823, it had traversed the Molucca, or Spice Islands, including the Island of Timor, where it appears to have attained the south-eastern limits of its progress. But still pursuing its north-eastern course, the pestilence continued for several years to ravage the interior of China; by 1827, it had passed to the north of the Great Wall, and desolated several places in Mongolia.

As contagious diseases, that can exist in different climates, have a disposition to extend in every direction, along the highways of human intercourse, we find that the cholera, even by sea, was not restricted to an eastern route. Soon after its appearance in the southern parts of Hindostan, the pestilence stretched from the coast of Coromandel to Ceylon, and during December, 1818, and the earlier months of 1819, it prevailed in that island, with a degree of virulence previously unsurpassed. Here, also, the shipping in the harbours were infected, and one of the most remarkable instances of this kind was experienced on board the Topaze, one of his Majesty's frigates. While the cholera prevailed in the island, the Topaze sailed for Mauritius, which lies about twenty-six degrees to the south of Ceylon. On the passage seventeen cases occurred. The circumstance, however, which imparts a peculiar

interest to the attack in the Topaze, is connected with the appearance of the disease in Mauritius. The frigate arrived in the harbour of Port Louis, the 29th of October, 1819, and it was not until the 18th of November that the cholera began to spread among the inhabitants. The people, therefore, were naturally led to suspect that the malignant form of the disease had been imported by the Topaze.

Upon inquiry, it appeared that the day after arrival, the vessel had sent thirty patients ashore to hospital, who were suffering from dysentery, inflammation of the liver, or debility. No patient, with decided symptoms of cholera, was observed among the men in hospital; but on board, a man had been attacked during the forenoon of the same day with severe spasms and vomiting. On the other hand, it was urged, as one or two cases of cholera had been noticed in Port Louis, early in the month of September, that the present very general attack should be attributed rather to the peculiarities of the climate than to importation. The latter opinion is not well supported. The one or two cases, indeed, were in all probability climatic, the disposition to spread, however, which is the grand characteristic of the Indian malady, was not deve-

loped previous to the 18th of November, a date perfectly reconcileable to the idea of importation.

The pestilence in the course of one month carried off several thousands of the population of Mauritius. The subjoined extract, taken from the governor's proclamation, will leave an impression of the dread and confusion existing at the time:—

"Major-General Ralph Darling, commanding in the Island of Mauritius, &c. &c.—Whereas the Council de Commune of Port Louis, the administrators of the Bank, and the principal merchants, have represented that the dispersion of the inhabitants, in consequence of the alarm occasioned by the diseases which prevail at this moment, has rendered it expedient that the payment of all bonds, notes of hand, and other negotiable securities, coming due during the course of the ensuing six months, should be postponed for one month after the period at which the same has been made payable; the Major-General commanding has therefore decreed, and decrees—From the 1st day of the present month of December, to the 1st day of June, 1820, no prosecution shall take place, nor sentence, nor judgment be pronounced for the payment of any bonds, notes of hand, and other negotiable securities, &c."

In the early part of January the cholera had greatly declined throughout the island, and the governor was enabled, on the 6th of the month, to make the following notification:—

"The Major-General will not omit this opportunity of expressing the gratitude he feels that the awful visitation with which the island has been so severely afflicted since the middle of November last, has at length almost entirely ceased its ravages. Since its commencement in Port Louis, it has pervaded all the districts of the island."

Taking advantage of the terrible example afforded in Mauritius, the Governor of Bourbon, a neighbouring island, distant about two degrees, adopted sanatory precautions to exclude the contagion. On the 7th of January, however, a vessel, called the Pic-Var,* from Port Louis, arrived off Bourbon, and had intercourse with the shore. The cholera broke out seven days afterwards, in the town of St. Denis. Nothing dismayed by this unfortunate circumstance, the governor ordered cordons of troops to be posted to cut off all communication with St. Denis, the focus of the malady, and a lazaretto was established for the

* Madras Government Gazette.

reception of such persons as might be attacked. Cordons were also established for their preservation at St. Susanne, St. Andre, and St. Benoit; but in the consternation which seized the inhabitants of these parishes, they dispersed, to seek safety in the interior of the country. The alarm created by the pestilence in Bourbon, and the vigorous proceedings of the governor, Baron de Mylius, may be conceived from the concluding sentence of the Order of the Day, which was, "*surveillance ou la mort.*" The consequences of these measures corresponded to the decision with which they were carried into effect. The cholera did not extend in Bourbon, as it had done in Mauritius, and the whole number of the persons attacked scarcely amounted to a few hundreds.

With this general notice we shall leave the southern and eastern branches of the contagion, and return to Hindostan, in order to describe a third, or westerly branch, in which the inhabitants of Europe have recently taken a deep and lamentable interest.

From the date of its origin in Jessore, the cholera occupied twelve months in crossing the peninsula of India to Bombay. In August, 1818, it entered this island, and pursued its customary desolating habits to a greater or less extent, until

the end of the year. After the first inroad had subsided, the inhabitants of the infected countries congratulated themselves on the final departure of the malady, but in this expectation they were in general deceived. The cholera continued to recur every year, in various parts of India, and also, at a later period, in China, and the Eastern Islands. Bombay was not among the places that escaped this prolonged calamity. In 1819, a second attack was experienced; and in 1820, a third, even more severe than the former. The severity, however, of the third visitation, did not secure Bombay from the influence of a fourth. In the latter end of May, 1821, the disease again commenced its ravages in a very virulent type, which is touchingly pourtrayed in the Rev. Mr. Davis's letter.* The following is an extract :—

"My spirits have been greatly depressed for some days past by the awful ravages of cholera. This dreadful disease has been for some weeks raging in all directions, but it did not appear in Bombay till about a fortnight ago. On the 28th of last month (May) it entered the barracks, in which the Bombay European regiment is quartered, and in three days I followed to the grave

* Missionary Register.

thirty-two persons. Five more were buried yesterday, and the work of death is still going on. One circumstance is very striking, that, with the exception of two cases, the men were, to all appearance, in perfect health, the moment before they were attacked. Some of them were taken ill while on parade, and some while lying on their beds. Several of them having taken hearty breakfasts at eight o'clock, have been screaming in agony, and brought to death's door by ten or eleven."

Before the expiration of the month in which the above letter was dated, the pestilence commenced its career in Muscat, a sea-port town of Arabia. The invasion of Muscat is for many reasons worthy of special remark, and perhaps more particularly so in its being the first stage, as it were, in the advance of the contagion towards Europe.

It has been supposed that the cholera was imported from Bombay to Muscat, and the connecting circumstances are strongly in favour of the supposition. Between these two places a frequent intercourse is maintained by ships trading in the merchandize of the respective countries. The period when the disease began in Muscat perfectly agrees in point of time, with the conclu-

sion that it had been imported. There was also a striking coincidence in the type of the malady at both towns, which should not be overlooked in the enumeration of circumstantial evidence. The type in Bombay was extremely rapid, as appears in Mr. Davis's letter, and that of Arabia was equally so, as is shewn in the following extract of a letter,* written on board the Kent, a vessel that was lying in the harbour of Muscat:—

"The cholera was raging with violence at Muscat, and making rapid progress to the westward. Its effects at Muscat appeared to be more fatally expeditious than in any part of India. Scarce ten minutes elapsed, in innumerable cases, before life terminated. On board the Conde de Rio Pardo, a jew merchant was in the act of closing a bargain for some tubs of sugar-candy. The merchant to whom he was talking was suddenly seized, vomited twice, and expired. So many fell victims to this scourge, that they did not even take the trouble to bury them, but sewed the bodies up in a mat, and turned them adrift in the cove. The Imaum says he has lost 10,000 of his subjects."

* Bombay Gazette.

Still travelling westward, the cholera ascended the Persian Gulf, and visited the sea-port towns on either side. It then extended inland in two directions, following the lines of commercial intercourse. On one hand, the malady was propagated from Busheer into Persia; on the other, it passed through Bassora, and pursued the course of the rivers Tigris and Euphrates into Asiatic Turkey.

Shiraz was the first place of note that suffered in Persia. Busheer, the sea-port leading to this city, is distant only ten or fifteen miles, and a constant communication for trading purposes is maintained between them. The cholera reached Busheer in August, 1821, and about the middle of September it broke out in Shiraz. The first case is said to have occurred in the palace of Shiraz, on the 15th of the month, in the person of a slave belonging to the family of the prince. During the 16th, one of the prince's wives and some Georgian ladies fell victims. At the end of the succeeding twenty-four hours, the prince's mother, one of his children, and several persons of less note, were numbered with the dead. The disease now spread rapidly, and within the first nine days, 1,800 casualties were reported. At the end of eighteen days, (according to an Indian

paper,*) out of a population not exceeding 40,000 souls, though a great number fled, on the first alarm, to places in the neighbourhood, and even to the open plains, full 6,000 deaths were counted. By migration and death, the town was "reduced to a desert; the bazaars were shut, and no business, public or private, transacted."

The main road extending from Busheer to the interior of Persia passes through Ispahan, and it might therefore be expected that this city would be attacked before Yezd, which lies at a considerable distance beyond it. Such, however, was not the case. The caravan departing while the cholera prevailed, followed, as was customary, the route leading through Ispahan, but, on approaching its vicinity, the gates were closed against the travellers lest the disease should also gain admission. As a precautionary measure the caravan was directed to pursue a route external to the walls in its further progress to Yezd. In Yezd, the cholera commenced during September, while the attack of Ispahan is dated in the succeeding month.

By the end of 1822 almost every place of note in Persia had been traversed by the pestilence, and its

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* John Bull, extract of a Letter date Shiraz, October 7, 1821.

diffusion here, as well as in India, seems to have been favoured by the operations of war. In the beginning of August, 1822, the Persian troops under the command of Prince Abbas Mirza, amounting to 30 or 40,000 men, obtained a victory over an equal body of Turks, which was encamped within a few days' march of Erzeroum. A short period previous to the engagement, the cholera had appeared amongst the Persians, and some persons had fallen victims. Notwithstanding the extension of the malady, the prince persisted in pursuing the retreating enemy, and, favoured by the fatigues of marching, the pestilential inroad suddenly assumed so decisive a character, that in a few days it destroyed 2,000 of his army. The increasing mortality left such an impression on the survivors, that a precipitate retreat was commenced towards Byzied, from which place the whole army dispersed without orders.

Before the autumn of 1823, the contagion had spread throughout Asiatic Turkey, from Bassora and Bagdad to Erzeroum and Antioch. It failed, however, to reach Egypt, having died away, in this direction, near Trepoli, a town in Syria.

But, still spreading in Persia, the few districts that had hitherto escaped were now visited. In August, 1823, the province of Shirvan was in-

vaded. After traversing Baku, and other ports on the western border of the Caspian Sea, the cholera appears to have been conveyed by water to Astracan, a Russian city situated at the mouth of the Volga river. In Astracan the disease became developed in September, and it continued to manifest itself until the rigour of winter, when this branch of the contagion, like the Syrio-Egyptian, finally disappeared.

Although Europe was relieved from the impending danger by the exhaustion of the contagious currents that had penetrated to Astracan and to the vicinity of Egypt, yet the source of these currents remained undiminished. In Persia the pestilence re-appeared every year for several years in succession, prevailing to a greater or less extent in localities that had been previously infected.

Of these repeated attacks, the one which commenced in 1830 demands the greatest share of attention. It overcame the natural and artificial barriers opposed to its progress, and eventually succeeded in penetrating to the heart of Europe. This European stream of the contagion (as it may be called) began on the western side of the Caspian, and, extending northward, it ravaged the town of Tauris in the month of June. Afterwards,

crossing the Russian frontier into Georgia, it entered Tiflis, and carried off several thousands of the inhabitants. In the mean time, Baku was again invaded; and by the 20th of July, the cholera appeared once more in the city of Astracan. A vessel in which cases had occurred during the voyage, was recently arrived from Baku. In Astracan the mortality was considerable. At the expiration of ten days, 1229 individuals had been seized, of whom nearly one half died, including amongst them the civil governor and almost all the officers of police.

In Russia the cholera observed the same laws that had marked its progress in India and other countries. Adhering for some time to the route of navigable rivers and high roads, it attacked, in the first instance, the boatmen, the travellers, and the towns situated on either side of these lines of general communication. In this way it ascended the Volga, and where that river approaches the Don, a branch of the contagion took an over-land course, and arriving at the Don, diverged in a northerly and southerly direction along its banks. On the Volga the towns were invaded in the following order of time: for example—Astracan in July, 1830; Tzaritzin, Saratow, and Novogorod in August; Kostroma,

Jaroslaw, and Moscow in September; Samara, Sinbirsk, Kasan, and Vladimir in October.

As the contagion had now become firmly fixed in numerous localities of the Russian empire, it continued to extend from these localities in various directions. Two remarkable branches proceeded in a northerly and southerly course. From Vologda, on the Dwina river, one of these spread toward Archangel; the other accompanied the Russian troops in the invasion of Poland.

During the summer of 1831, the progress of the pestilence has been exceedingly extensive. In April it commenced its ravages in Warsaw, and since that period it has travelled westward to Dantzic and the gates of Berlin and Vienna; northward to Archangel, and southward beyond the Danube. In short, few towns have hitherto escaped in that immense tract of country which lies between the river Volga, the Baltic Sea, and a line passing through Berlin and Vienna; and between the White Sea, and the Balkan Mountains in European Turkey.

LAWS OF CHOLERA.

The laws which we shall notice are five in number, and they may be comprehended under the following designations :—

1st, *Climatic Influence*—The contagion of cholera may spread in every climate, with its spreading powers but slightly, or not at all, impaired.

2nd, *Predisposition*—Persons in certain states of bodily health are peculiarly liable to be attacked.

3rd, *Latent Infection*—The period of time during which the contagion lies dormant in the system rarely exceeds three days.

4th, *Increase and Decline*—When the cholera appears in a town it extends rapidly, and, in general, runs through its course in the space of a few weeks.

5th, *Contagion*—Cholera is contagious, and its contagion is of a highly diffusible nature.

Climatic Influence.—There is nothing can shew more strongly how much mankind are de-

pendent upon experience for their knowledge than the opinions which, during the early progress of cholera, ascribed the extension and cessation of its inroads to the agency of the most ordinary circumstances. While the disease was spreading in particular directions through the upper provinces of India, its exciting cause was generally attributed to sudden changes of the weather, to the prevalence of easterly winds, or to the sensible character of the soil of the infected districts. In this way we often hear, that during the invasion, the wind was blowing either "deadly hot" or "deadly cold;" that a storm and the disease appeared simultaneously, and were considered as "cause and effect;" that a river or lake was dried up, and "cholera emerged from the slime," &c. &c. A longer acquaintance, however, with the phenomena has taught us to look on these coincidences as merely casual. Beyond the province of Bengal and its immediate neighbourhood, the laws of cholera have been singularly uniform, and it may be inferred that the exciting cause of the disease was equally so.

At first, also, cholera was slow to ascend mountains, and, instead of referring this to its proper cause—the thinness of the population in such localities, and their limited intercourse with the

plains—the non-contagionists declared it decisive of the truth of their opinions, and maintained that cholera could not exist in the pure air and dry soil of elevated regions. Here, as before, they reckoned prematurely. In the month of June, 1818, the pestilence crossed the mountains of Nepaul, and visited Catmandoo. And, again, in August, it ascended the lower range of the Himalayah mountains, entering, on the 10th of the month, the town of Almora, which is situated 5,337 feet above the level of the sea. In October, the disease had extended north to Deyrah Doon. In this valley, the village suffered very severely. Moreover, of a body of 900 troops, 113 were attacked, and 74—almost two-thirds of the number—perished. The medical officer was amongst the first seized, and to the want of his assistance the great mortality has been chiefly ascribed.

Cholera has since extended through various countries, contained between the latitudes of twenty degrees south, and sixty-five degrees north of the equator; and, in longitude, its ravages have been propagated through upwards of one hundred degrees. We shall, therefore, conclude, that cholera may exist in every habitable part of the globe.

In the south of India, the contagion appears to

have spread uninfluenced by the seasons; but in higher latitudes its spreading powers seem to have been less active in the winter than in the summer and autumn divisions of the year. It is difficult to decide whether this depends upon diminished energy in the contagion itself, or upon a diminished susceptibility on the part of the inhabitants to its impressions. It may depend partly upon both.

Predisposition.—In medicine, there is not any fact better established than that certain states of bodily health are peculiarly favourable to the formation of certain diseases. These predisposing states, as they are called, differ in regard to different maladies. Children are strongly predisposed to small-pox, measles, and chincough, while they are comparatively little susceptible of plague, typhus fever, and cholera The nature of the constitutional condition which predisposes to the infantile affections is altogether unknown, and why one attack should render the system secure against a second, is equally inexplicable.

Although children are predisposed to one attack of small-pox, it does not appear that they are at all times in this state of predisposition. It occasionally happens that children may have resided,

or have had frequent intercourse, with others suffering from small-pox, and yet escape infection, while at a later period they will contract the disease when apparently but slightly exposed. In some rare instances, indeed, individuals seem to be proof to the contagion during life, shewing that they were never predisposed; and in still rarer instances, individuals have experienced a second attack, shewing that their predisposition to small-pox was stronger than that recognized in the general rule.

Unlike small-pox in the wide range of its infecting power, the plague, the typhus, and the cholera, attack only a part of the population. By observing, therefore, the habits and bodily condition of the people who remain untouched, and of those who are infected, we may form some conception of what constitutes the predisposition to these distempers. In Egypt, the plague chiefly prevails among the poorest classes, who live irregularly, and exposed to the deleterious atmosphere of close dirty hovels. On the other hand, persons in comfortable circumstances, who live regularly, and in clean well-ventilated houses, are less susceptible of the morbid impressions. The typhus fever in England, and the contagious cholera in India, follow an analagous course.

We do not intend that the terms regular and irregular living should be restricted to the use of, or abstinence from spirituous liquors, but to be extended to every act that can possibly throw the vital resources of the body into extremes. In this way, fatigue, whether incurred in the pursuits of business or pleasure, insufficient exercise, eating to excess or long fasting, and violent mental emotions, may prove respectively strong predisposing circumstances.

In India, the cholera attacked the various classes of the inhabitants to a greater or less extent, according as they were more or less exposed to fatigue and irregular modes of life. The Europeans suffered less, comparatively, than the natives; and of these, the higher less than the lower classes. Women, also, suffered less than men, and children in a less degree than either. The difference of predisposition in native men, women, and children, is illustrated in the following list, which exemplifies, in addition, the increase and decline of the attack on a pretty large scale.

Died of cholera in Bombay, during eleven days:

		Males.	Females.	Children.	Total.
1820. May	1	11	6	0	17
	2	16	16	2	34
	3	18	14	2	34
	4	16	8	6	30
	5	36	17	3	56
	6	46	30	5	81
	7	33	13	6	52
	8	14	26	11	51
	9	35	14	5	54
	10	17	19	12	48
	11	12	9	3	24
		254	172	55	481

The partial immunity enjoyed by Europeans over the natives has been universally ascribed to a difference of physical constitution. Weak constitutions were said to be more susceptible than those which were strong. But taking the word constitution to mean here the original resources of the system before they are impaired by disease, the conclusion does not appear to be exactly correct. If constitutional weakness were the cause of the difference, women would have been attacked rather than men. The reverse being the fact, it can only be accounted for satisfactorily by attributing the greater susceptibility of the latter to temporary circumstances, as their laborious occupations, frequent exposure to a burning sun, &c.

Had a similar degree of temporary exhaustion been induced in all—native men and women, and Europeans—it is probable that their predispositions respectively would have been the same. Were the small proportion, however, which the Europeans bore to the native population taken into account, it would, perhaps, appear that the exemption of the former has been overrated. The experience of the life-insurance offices in Calcutta does not evince a small mortality among Europeans. Of those insured at the Laudable and Union Societies,* the number of deaths between October, 1817, and November, 1818, was sufficient to reduce the value of lives to one half of the estimate formed on the best tables, and on the experience of former years. The register of the Union Society exhibited a proportion of deaths for that period four times as great as the average of the four preceding years.

In the north of India, the Mohammedans used a more nutritious diet, and went better clothed than the Hindoos, and, in general, they were less liable to the malady. That this did not depend upon the stronger constitutions of the former, is seen in the effect which succeeded to a temporary

* Bengal Report

exhaustion. When the cholera prevailed at Delhi, it happened to be the period of the year in which the Mohammedans observe their annual Fast, or Ramazan. During the Fast, all orthodox Mussulmans abstain from food while the sun is above the horizon. Persons of this sect, therefore, suffered more extensively during the Fast than the Hindoos, who lived after their ordinary manner. At Calcutta, many of the workmen suffered not in the ratio of their constitutional strength, but according to their temporary exhaustion. The mechanics working in the open dock-yards receive high wages, and live in a superior manner with regard to diet and other domestic comforts; yet they were more frequently seized than the day labourers of the poorest order, employed under shelter in the Cotton Screws.

Of all the circumstances predisposing to an attack of cholera, fatigue consequent to travelling, or to hard work in the open air, was the most powerful. Accordingly, we find that troops upon the line of march, and people whose occupations exposed them to the weather—as boatmen, fishermen, husbandmen, gardeners, grass-cutters, washermen, palankeen-bearers—were extremely subject to the disease. The non-contagionists advanced this fact in support of their opinion, that the exciting

cause of cholera resided in the atmosphere; but it merely indicates that the greatest degree of fatigue in the Indian climate, and consequently the strongest predisposition, was incurred in the open air. The exceptions to the rule shew that something was required apart from atmospheric influence to engender the disease. "While * cholera prevailed at Madras, the labourers at certain public works, who were protected from the weather, who were well clothed and fed, and who had no unusual work to perform, suffered from it severely; while a body of many hundred people, employed in digging and cleaning out the beds of stagnant, brackish, and extremely putrid waters, equally during the extreme heats of the season as during cold and rainy weather, entirely escaped. This immunity is the more remarkable inasmuch as many of them laboured during the night for the purpose of preventing the accumulation of water, and were of course exposed, with very scanty clothing, to the utmost vicissitudes of heat and cold, and to all the exhalations and depositions of the very tainted air in which they worked."

Debility from other diseases predisposes to cholera, and for this reason convalescents were often

* Report of the Madras Medical Board.

attacked. Many were infected while under the influence of mercury which had been administered for the cure of fever, and inflammation of the liver. The Europeans of the flank battalion, a year previous to their attack in the grand army, were debilitated by fever at Allahabad. The battalion consisted of 800 men, and of these, at one time, 200 were in hospital with cholera. The surgeon and 54 men perished.

Any derangement of the system which resembles the symptoms of cholera itself, is peculiarly liable to admit the disease. Affections of the bowels leading to vomiting or purging, are of this character. Also the action of purgative medicines attended with an aqueous discharge. During the prevalence of cholera, the use of Epsom salts should be specially avoided.

It was observed by the medical officers in Bengal, that a second attack of cholera, provided the effects of the first had been completely removed, was exceedingly rare. Relapses, however, were occasionally recorded. In the Nagpore force a few instances of relapse happened among those who had recovered from the severe symptoms. The most remarkable of these cases of repeated infection was that of an European. He had been twice attacked while under the influence of mer-

cury, and had so far recovered from both as to return to his duty. At the end, however, of five or six days he contracted the disease a third time, and died.

As one attack generally destroys, at least for a considerable time, all predisposition to cholera, there is reason to believe, also, that the predisposition may be impaired by frequent intercourse with the sick. People who have mingled often with the sick are in less danger of infection than those who are not accustomed to such exposure. A village (says the Bengal Report) which was visited by the cholera during the first year of its prevalence, would be much less likely to suffer, on the disease re-appearing in that part of the country, than another village which had not been previously invaded; and an individual going from the former into the infected air of the latter would have a better chance of immunity than its inhabitants who had not yet undergone the seasoning.

The protection, however, derived from intercourse with the sick may be lost after a time, in case the individual removes out of the infected to a healthy atmosphere. In this way also, medical men who have been steady residents in a fever-hospital, and who seemed proof to the contagion

of typhus, have been known to contract the disease immediately on their return from a visit to the country.

In a few words, the predisposition to cholera may be said to consist of *any* derangement of the functions of the body. While the current of vitality is urged forward at a healthy and uniform pace, the contagion has scarcely power sufficient to arrest its progress; but the least irregularity of motion, whether induced by exciting or depressing causes, will favour the operation of the contagion, and may lead to the formation of the disease. In prescribing rules of diet, &c., in order to escape this irregularity, previous habits should always be taken into consideration. The man who has for years been accustomed to luxurious living and a moderate allowance of wine, will certainly be less predisposed to cholera in continuing these indulgences, than if he hastily adopted a sparing regimen; and a man who has lived abstemiously will have his chance of exemption increased, by persevering in his abstemious system. Every *extreme*, however, habitual or occasional, ought to be guarded against.

Latent Infection.—After a morbid poison finds its way into the human body, a longer

or shorter period will elapse before its effects become apparent in the constitution of the person infected. Individuals who have been bitten by mad dogs are generally seized with symptoms of rabies within two or three weeks subsequent to the accident; but instances occasionally occur where the period of latent infection is limited to a few days, or extended to several months.

The contagion of small-pox usually remains dormant one or two weeks. The contagion of cholera is more rapid in its course. His Majesty's 54th regiment landed at Madras on the 10th of May, 1822, and marched into quarters in Fort St. George. The voyage from the Cape of Good Hope had been performed in forty-eight days, and the men were in a high state of health. Within three days after their arrival, however, the cholera appeared amongst them, and it did not finally leave the corps until the 1st of July. Of 632 men, 159 were seized, and 54 died. The European women and children suffered considerably, while very few of the native camp-followers were attacked. Examples of the disease occurring in people recently come from sea, are the best that can be possibly furnished to determine the time of latent infection, for in the cases of per-

sons resident ashore, we can scarcely ever be so certain as to the date of their first exposure to the exciting cause.

In Hindostan, the period of latent infection seems to have frequently consisted of two or three days. A detachment of troops marched from Meerut, in 1818, to join the forces collecting at Hansi. On the 29th of July the detachment reached Delhi, where the cholera was then raging, and, having passed through the city, it encamped outside the walls. On the 31st, the men composing the detachment were attacked. In April, the followers of the Governor-General's escort were first seized, three days after encamping near a diseased village. Mr. Elphinstone's party arrived in Nassick, an infected town, on the 21st of August. The party left Nassick on the 23d, and the day after their departure a severe inroad of cholera begun.

Although the miasm of cholera frequently remained latent for two or three days, the cases in which this period was observed, bear a small proportion to those apparently attacked within one day after exposure. A few of the latter may be given for an example. In Bombay the first case was that of a man who had been on a visit to Poonah, and had passed, on his return, through Pan-

well, where the cholera prevailed. He died during the day of his return. His wife, and the wife of a man who lived next door, were seized the day following. Surgeon Connell observes that a woman, the wife of a conductor in the artillery lines, was attacked. She was attended for two hours by her friend, Mrs. Gray. Mrs. Gray was seized soon after this intercourse, and died the ensuing morning. The son of Mrs. Gray, a boy aged five or six years, was seized the day after his mother's death.

From the rapidity with which cholera spreads in a densely-peopled town or camp, it might be inferred that the contagion is capable of producing the disease in an exceedingly short period, at least in persons strongly predisposed to its influence. This is seen, however, in some detail facts. The Nagpore force was attacked almost immediately on its return from the siege of Chandah. Scarcely had the men taken possession of their lines, "when the cholera, like a plague, fell upon the Bengal troops and followers with dreadful havoc."

The intense predisposition manifested in these troops, as they had been previously free of disease, appears to have depended upon the fatigues of marching, and the arduous service in which

they had been engaged. Among the inhabitants of Nagpore, the cholera had existed for some time.

The attack of the Nagpore force, under the circumstances detailed in the Indian Reports, is quite conclusive that the period of latent infection is in some instances extremely short; but as the troops may, by possibility, have been exposed to the exciting cause before their arrival in the neighbourhood of Nagpore, we shall adduce an indubitable example of rapid infection. His majesty's 41st regiment arrived in two divisions from England on the 6th and 15th of July, and marched into Fort St. George, at Madras. The men of the first division were almost immediately attacked with cholera. Those of the second division landed during its prevalence, and several of them were taken ill in the course of the morning of their landing. Of 714 men, 159 were seized, and 32 died.

We are unable to determine what is the longest period during which the contagion of cholera may lie dormant in the system. In India, while three days appeared to have comprehended, as a general rule, the time of latent infection, some cases were recorded which would favour the belief, that it may be occasionally extended to the end of

a week after the first exposure to the exciting cause.

Increase and Decline.—When cholera enters a town or a camp, its presence is first ascertained in the occurrence of one or a few cases. The cases gradually increase in number for the first week or so, after which the disease is soon developed in every direction. It prevails to a frightful extent during a week or a fortnight, according to circumstances, and then rapidly subsides, leaving the surviving inhabitants astonished at its "capricious" habits. Thus cholera appeared in the camp of the grand army on the 6th of November. By the 15th of the month it had overspread the camp. From the 15th to the 20th, its ravages were the most extensive. After the latter date it began to decline, and few new cases occurred subsequent to the 23d.

The fact of the contagion spreading in eight or ten days, from one or a few persons, throughout a population amounting to many thousand souls, leads to a very important deduction, namely, *that the contagion of cholera is of a highly diffusible nature.* The evidence of its diffusibility does not rest upon an isolated example, as the attack in the grand army: it has been afforded in all places yet vi-

sited, and however distant from each other. For instance: in the city of Madras the inroad commenced on the 8th of October, and subsided early in November. In Mauritius it commenced about the middle of November, and subsided early in January. In Shiraz, the Persian city, it commenced on the 15th of September, and subsided before the middle of October. In Penang it commenced on the 23d of October, and subsided in the first week of December.

The diffusible nature of the contagion being admitted, we can, with the assistance of the law of predisposition, rationally account for the phenomena of increase and decline. In every large town which has not been invaded, there will be a considerable proportion of the inhabitants in a state of predisposition. As soon as the cholera arrives it begins to spread among the persons predisposed, and it will continue to spread rapidly until the whole of these are infected, or until such time as their predisposition is destroyed by seasoning. After this period very few cases comparatively occur, and the subjects of those that do occur are chiefly strangers who have come from a healthy locality, or residents who have had their seasoning immunity destroyed, by a more than common degree of exposure to strong predis-

posing circumstances, as great fatigue, or great constitutional debility, &c.

One attack, however, will not uniformly secure a town against a second. In individual cases the seasoning may be impaired during a residence in an untainted atmosphere, and it also happens that the inhabitants of a town which has been perfectly free of the disease for several months, may lose, in consequence of this purification, the immunity previously enjoyed, and may come to suffer from a second inroad, but the first is generally the most severe.

The time which cholera occupies in running an uninterrupted course of increase and decline, has generally consisted of from two to six weeks. The length of the period in any town will depend upon a variety of circumstances, as the concentration of the inhabitants, their intercourse, &c. An efficient quarantine on houses also may shorten the attack, or a partially efficient system may prolong its duration.

Contagion.—Few questions have divided the medical world to a greater extent than those relating to "contagion" and "non-contagion." The reason of this is chiefly to be found in the difficulties which encompass the subject. The agent

called *contagion*, like what is known by the name of *gravity*, eludes the cognizance of the external senses, and no medium, mechanical or chemical, has as yet been discovered capable of detecting its presence. The existence then of contagion is an inference drawn from the phenomena of disease. For example—a child having been brought into the near vicinity of a patient suffering from small-pox (in this disease contact is not indispensable) is attacked, in the lapse of some days, by a similar affection. The same effect follows in a number of instances with respect to a number of children. Here the uniformity of the phenomena leads to the suspicion that the malady has been communicated from individual to individual, and it will remain for the physician to discover *how* that communication was maintained. As nothing can be seen passing from the diseased to the healthy child, it inevitably follows that the exciting cause is invisible; and as the atmosphere, immediately above and around the patient, communicates the infection, it is clear that this invisible body may be diffused through the air.

That a contagious vapour, or subtile fluid, capable of exciting the disease, emanates from the bodies of patients labouring under small-pox is universally admitted. Regarding other diseases,

however, commonly reputed contagious, a diversity of opinion has been entertained. The Egyptian plague, and typhus fever are select in the choice of their victims—in general they attack only a part of the population—several physicians, therefore, have denied their contagious power. This opinion was ably advocated several years ago, by Dr. Maclean, but, in the present day, few doubts, we believe, exist on the subject.

Like typhus, the attacks of cholera are chiefly restricted to persons in certain states of bodily health. These states we have endeavoured to describe under the head of predisposition, and the law being recognized, it naturally follows that many persons may be exposed to the miasm of cholera, and yet escape the disease. To this want of uniformity, in the effects which succeed to exposure, the difficulty of proving the contagious nature of cholera from individual cases, must be attributed; but as the disease has travelled over a large portion of the globe, there are other ways equally certain of arriving at a knowledge of the fact.

Before inquiring on what the propagation of cholera depends, it will narrow the question to a more tangible shape, if, in the first place, it can be shewn in some measure, on what it does not depend. Many persons suppose that the influence

of the atmosphere or of the soil of the infected countries is sufficient to account for the extension of cholera, but that it is altogether independent of any sensible quality in either the soil or the atmosphere, may be made sufficiently evident.

In its general summary of facts the Report of the Madras Medical Board observes :—

"With respect to atmospheric influence, the general historical observations which have been premised, tend to shew that cholera has neither been confined to any particular period of time, nor to any particular tract of country, but yet that it has been infinitely more prevalent at one time than at another, and in one tract of country than another. The narrative and original papers included in the present report, and the other publications on the same subject, in Bengal and Bombay, all prove likewise, that cholera is capable of exerting its influence undiminished in every state of atmosphere, so far, at least, as is evident to our senses, or determinable by instruments."

And again :—

"The wide and uniform diffusion of cholera, which we have witnessed, has taken place over countries bearing little or no resemblance to that where it originated : and their climate and seasons especially, have been altogether dissimilar. It

may consequently be inferred, that the disease has either been propagated by infection or contagion; or that its progress is owing to circumstances beyond our knowledge, thus ranking cholera amongst many other epidemics, the causes of whose origin and progress are equally unintelligible and unknown. The latter conclusion obviously leaves the question of the infectious or contagious quality of cholera undecided. The supporters of that theory object to the occult or unknown circumstances alluded to being resident in the atmosphere, forming what might be termed its choleric constitution: for, they observe, the disease in that case could not make any sensible progress directly against the continued and violent monsoon winds; nor could villages or tracts of land escape the disease when all around them were suffering from it. They confirm these arguments by the following facts.

"Bodies of troops, in motion, have been attacked, and have retained the disease while it was unknown to the fixed inhabitants of the country through which they passed. One, of two corps in a camp, has been attacked, and the other has escaped the disease. Ships arriving from other parts of the world, have never suffered under the assumed epidemic constitution of the atmosphere

before reaching the shore. They farther urge that the supposition of a power not infectious, existing in the air, which is capable of producing the disease, is purely gratuitous, and has been shewn to be hardly reconcileable with our acknowledged experience. Diseases avowedly infectious, such as small-pox, measles, &c., have not at all times the power of spreading epidemically; for, while it is certain that their exciting causes are never wholly extinct, it is only at particular periods that these diseases become epidemic."

One addition will complete the circle of the preceding reasoning and evidence. It is admitted by all parties that the cholera continued to spread among the crews of ships after they had left the ports of India. If the cause then of the disease be connected with the soil, how does it produce its assumed effects on the waters of the ocean? The ship Carnatic anchored in Madras Roads, the 5th of August, clean, and with a healthy crew. While at anchor six cases of cholera occurred on board, and they terminated favourably. The vessel sailed on the 20th, with fine weather and light breezes. On the night of the 27th, a robust man who had recovered from an attack at Madras, was re-seized, and he died at 2 o'clock A. M. of the 28th. At 8 o'clock P. M. of the 29th, the joiner

was seized, and he died at 8 o'clock A. M. of the 30th. At 4 o'clock A. M. of the 30th, a healthy seaman, aged thirty-five years, was seized, and he died at mid-day. In the same morning, of two lads taken ill, one died at 3 o'clock, and the other at 6 o'clock P. M. During the succeeding night, a man was seized, and he died in seven hours. At 8 o'clock A. M., of the 31st, a stout middle-aged seaman dropped down in convulsions, and died at 6 o'clock P. M. After this there were six more seizures, but the subjects of them recovered.

An exception has been taken to the instance of the Carnatic. She was bound up the Bay of Bengal, and therefore, it has been supposed, by the non-contagionists, that the winds from the shore *may* have reached her. Will this, we ask, furnish a satisfactory reason for the disease becoming more virulent when the vessel receded from the shore? In harbour the cases recovered; at sea they were fatal. But the attack in the Carnatic is not essential to prove the general statement that the cholera is capable of extending at sea. Out of several examples we shall select one, which is perfectly unexceptionable. The Topaze frigate, as formerly stated, while the cholera raged in Ceylon, left that island for Mauritius. Cases of cholera occurred at intervals during the passage,

and by the date of her arrival seventeen persons had been attacked. The distance between Ceylon and Mauritius measures upwards of *two thousand miles*, and while holding her course, the vessel had, on either side, the whole expanse of the Indian ocean, from Africa to New Holland.

Further testimony would cumber our pages, for it is clear, beyond confutation, that no hypothesis hitherto founded upon the known qualities of the soil or atmosphere, or founded upon any *imaginable* qualities, can even plausibly account for the propagation of cholera in Asia, Europe, and the Islands. When men of talent, therefore, who have studied the subject, doubt the existence of contagion, their doubts are to be understood simply as an acknowledgment that *they* are unable to account for the extension of the disease on the theory of contagion, or on any other theory reconcileable to the admitted facts of its history.

Now, having considered the proposition "on what cholera does not depend," one of these two alternatives remains for our adoption,—either to furnish proof that cholera is propagated through contagion, or to acknowledge, with the reasonable part of the non-contagionists, that we are totally ignorant of the cause. Our conviction of the former being the correct conclusion, is

strongly supported in the geographical progress of the disease. In India, most of the inland towns and villages are seated on the banks of navigable rivers, and, accordingly, these places were at an early period invaded. The cholera ascended the rivers, "attaching itself to the ferries and market-places," and the towns situated near their margins; while the towns situated at some distance escaped for a time. "To what cause" (says the Bengal Report) "are we to ascribe this marked disposition of the disease to follow the course of rivers? This tendency was observed in so many instances, that it can by no means be considered to have been accidental. From the rise of the disorder on the banks of the Ganges and Brahmaputra, to its arrival at the mouths of the Nerbuddah and Taptee, it excited the surprise of the medical observer." To what shall we ascribe it, if not to the frequent intercourse maintained along these rivers? Through the same medium, it was propagated along the principal roads, and subjected to similar peculiarities. Had the miasm been atmospheric, it would have passed over the country, "as the crow-flies," and the towns in its line of route would have been always infected in succession, according as they were more or less distant from the original focus

of the miasm. But a large army encamped on the banks of the Sinde, and in constant communication with Bengal, receives the disease before the cities to the east of the Ganges, which are less distant. From Etawah, the cholera travelled to Futteghur, without infecting many of the intervening villages. From Agra, it travelled to Delhi, and the towns and villages between escaped, although they are situated low and exposed to noxious effluvia. From Husseingabad it travelled to Nagpore, and the town of Baitool, which stands on the main road, remains untouched. Nagpore and Mooltay are above sixty miles apart, and the cholera passed from one to the other without entering the intermediate villages. Further south, also, many towns were infected, not in succession according to their distance from the place where the distemper prevailed, but according to the extent of their intercourse with that place. Thus the disease travelled from Jaulnah to Punderpoor, and from Madras to Trichinopoly, long before it could extend to places of minor resort, which were within half the distance.

Moreover, shewing that cholera may be transported in the human body, and propagated from that source, the commencement of the inroad has

coincided with the arrival of persons from infected places, and these persons and their families and neighbours have been the first to suffer. On this head, we shall quote from the Report of the Madras Medical Board. "There are several instances recorded where the cholera has been first manifested at a place, in the attack of an individual, who had come from some other place where the disease existed. The first case of an European which occurred at St. Thomas' Mount, was of a man who had left Madras on the morning of the 15th of October. Proceeding on his journey towards Trichinopoly, in the evening he was taken ill about a mile from the Mount, brought back to the house, where he had passed the day, and there died. On the 17th the wife of that person; on the 19th the owner of the house; and on the 21st his wife; all experienced attacks of cholera, but recovered. Several of the native servants also suffered. The instances of the disease appearing at places immediately after the arrival of corps and detachments, which were suffering from it, are very numerous. For example, it appeared at Jaulnah, immediately after the junction of a party from Nagpore, amongst whom it prevailed. It appeared at Aurungabad, and at Mulligaum in Candeish, after the arrival of parties who had

left Jaulnah at the time the disease was prevalent there, and amongst whom it had broken out on the march to these places. It appeared a second time at Mulligaum after the junction of the first battalion, 5th regiment, in which cholera prevailed. It appeared at Secunderabad after the arrival of a detachment suffering from it; and it appeared afterwards in the villages through which the detachment had moved. It appeared at Ghooty, where no case had been observed for six months before, immediately after the arrival of the first battalion, 16th regiment, in which it prevailed with great mortality. It is remarkable, that the same formidable type of the disease which prevailed in the marching corps, was communicated to the corps at Ghooty. It also spread on that occasion to the adjacent villages. It appeared in a detachment of artillery, previously perfectly healthy, upon their encamping on the ground, which had been immediately before vacated by the first battalion, 8th regiment N. I. in which corps the disease prevailed: the bodies of several persons, who had died of cholera, remained exposed on the ground, when it was taken up by the artillery. Moreover, marching corps and detachments have been seized with cholera on coming to places where it was prevalent."

To diminish the weight of these ascertained facts, the non-contagionists have adduced many instances where individuals and bodies of men have escaped contracting cholera, under circumstances apparently analogous to the foregoing; and they have also adduced instances where the introduction of cholera could not be traced to the arrival of persons from districts previously infected. The facts, however, remain unaltered; and we cannot see any force in this negative evidence. Contagion is a subtile agent. Many peculiarities which favour its extension or suppression will be concealed in the imperfection of our senses; and frequently the manner in which it gains admission to a camp or a town will baffle all inquiry, and more particularly the superficial inquiries generally instituted on such occasions. The same happens, moreover, with regard to small-pox, whose contagious property no one doubts. In England it is of common occurrence, that the attack cannot be traced to exposure, although exposure was undoubtedly sustained.

The difficulty of discovering the source of individual attacks often originates in the insulated existence of the contagious body itself. The vapour which emanates from patients in small-pox has not only the power of exciting the dis-

ease at the period of its emanation, but it may actually lodge in the walls of an ill-ventilated apartment, or accumulate in the patient's bedding and clothes, so as to form *foci* of infection after the disease has completely disappeared. The time, during which the vapour is able to retain its infecting power in this insulated state, will chiefly depend on external circumstances, for it is well known that contagion may be destroyed, or at least dissipated and rendered inert, by the currents of air and light admitted in free ventilation and the operations of cleansing, as the washing of clothes, white-washing of walls, &c.

Many physicians are of opinion, there is not any evidence which would warrant the inference, that the contagion of cholera may retain its infecting power in the insulated state.* We cannot subscribe to this conclusion. The medical board of Bombay state in their report : " It appears to us that it is capable of being transported from one place to another as in cases of ordinary contagion

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* An able foreigner, Moreau de Jonnès, who has been long engaged in observing the phenomena of cholera, is of opinion that its contagion may be conveyed in goods.

or infection." And Mr. Jukes observed, when the cholera had almost disappeared at Tannah, that nine cases occurred in succession in one apartment of the barracks. As the disease had subsided elsewhere this looks very like the harbouring of infection. Mr. Jukes had the apartment scoured and fumigated, after which no other case occurred. In Samulcottah, the disease commenced immediately after the arrival of troops, and first among the people who had associated with them. The troops had not suffered from cholera on their march, but Surgeon Wight remarks, "they might not have had cholera actually raging amongst them, although its fomites were present and ready to be called into action, whenever favourable circumstances occurred." During the early progress of cholera, large bodies of troops, though in good health previously, seldom performed a march in Hindostan without being attacked. The contagion was probably carried with them, and as soon as the fatigues of marching formed the predisposition, it overpowered the resistance of the constitution. According to Surgeon Chalmers, "travellers seem on all occasions to be more obnoxious to its attack than residents, and seem capable of carrying with them, to a considerable distance, a sort of infected cholera

atmosphere." The second battalion of the 23rd regiment of Native Infantry, on its march from Cannanore to Nagpore, experienced a very fatal invasion on the road between Ghooty and Hyderabad. The cholera commenced in November, and by the end of the month 150 men had been carried off. In December only 14 died. Here the operation of a specific cause apart from the atmosphere was evinced in the fact, that a considerable detachment from Madras, which followed one or two days' march in the rear of this corps, during the period of its greatest suffering, escaped the disease altogether.

Independent of direct evidence, however, analogy would warrant the inference, that the contagion of cholera may retain its infecting power in the insulated state. It is a general law with respect to the contagions of other diseases. Moreover, this might be inferred from some of the most striking features in the progress of cholera. The progress of cholera in Persia, and other countries distant from Hindostan, and consequently beyond the range of the influence which originally produced it, is to us decisive of the question. Many districts, after having been for a time free of cholera, have come to suffer again and again, without a fresh importation of the active disease.

Although the contagion of cholera may exist in the insulated state, it will seldom be able in this state to retain its infecting power during a long journey, unless renewed from time to time by the occurrence of the disease. The diffusibility of its nature, which favours its growth and extension in a town, will tend rapidly to destroy it when apart from the sources of production. Even stationary, as in a city, upon the cessation of an attack, it is probable that the insulated contagion soon dies out among the inhabitants, who are clean in their persons and who live in well ventilated apartments; and that it is chiefly preserved amongst the poor, who are dirty, and who live cooped-up in filthy hovels, the interiors of which never saw the purifying light of day.

Enough, we think, has been already said to justify us in assigning a contagious property to cholera, but before leaving the discussion, we shall adduce two general facts, which are of themselves sufficient to support this opinion.

The first is connected with the local progress of the disease, as when it begins in a camp or a town. Here, its first appearance is announced in the attack of one or of a few individuals, and the number of the cases *gradually* increases. This course cholera has universally pursued.

Now, had the cause of the disease been generally diffused in the atmosphere of the camp and town, would not great numbers of the people have been attacked, almost immediately, on the occurrence of the first case?

The second general fact is the following:—Among the islands of the Indian Ocean, it was observed that the cholera uniformly commenced its ravages in the sea-port towns, or in those towns seated a few miles inland, which have a constant intercourse with their harbours at the shore. In the island of Mauritius, the disease first appeared in the town of Port Louis. In Bourbon, the town of St. Denis was the first attacked. In Java, the town of Samarang, and so of the islands Sumatra, Penang, Borneo, Celebes, Lucon, &c. In the Persian Gulf, also, the same order of infection was observed. Muscat, the principal trading port town, first received the disease. Then, the port of Bahrein, and Busheer and Bassora. How can this extraordinary and uniform partiality which the cholera exhibited in its choice of sea-port towns for its first inroad, be explained, unless on the principle of imported contagion!

QUARANTINE.

The interests of a commercial country require that vessels should enter and depart from its harbours without let or impediment—for the interposition of a very slight delay, may completely alter the character of a mercantile speculation, and the interval of a single week may convert a valuable article of import into an unmarketable drug. In such a country, therefore, no regulations restrictive of the freedom of maritime enterprise should be adopted without the strongest plea of necessity, and the best founded assurance that they are likely to prove adequate to the accomplishment of their object. If injudiciously framed or imperfectly executed, they merely serve to aggravate the evil they were intended to prevent. These observations are peculiarly applicable to the quarantine laws, the operation of which is not only detrimental to property, but productive of very serious annoyance to individuals, by the sacrifice they are

obliged to make of their personal liberty to the general safety.

The progress of the Eastern Pestilence, and the evidence of its contagious character, leave no doubt of the propriety of submitting to many inconveniences for the purpose of staying its approaches to our shores—no rational means should be left untried to bar the introduction of so terrible a scourge—and as the magnitude of our dealings with foreign countries tends at once to augment the peril, from the disease, and the pecuniary loss incidental to the adoption of sanatory precautions, it is manifestly unwise to have recourse to these precautions at all, unless they are based upon sound principles, and scrupulously carried into effect.

The efficiency of quarantine regulations will depend upon their being adapted to the nature and laws of the agent they are intended to exclude. If the lurking poison long retain its power under circumstances unfavourable to its developement, then must the term allotted to the purifying process be proportionally protracted. For persons in apparent health, the quarantine must always exceed the longest probable period of latent infection. The time apparently ne-

cessary to destroy or dissipate the insulated contagion, is the point by which the detention of goods ought to be determined.

Although goods from infected countries be uniformly subjected to the purifying process, it by no means follows, that these goods contain a particle of contagion. Indeed, it will not generally happen that the common articles of merchandize should have come within infecting range of a person labouring under a dangerous and rapid malady, or if they have, that they will retain the noxious vapour through the various degrees of atmospheric exposure which they undergo previous to exportation; as they *may*, however, be infected, prudence inculcates the propriety of guarding against the contingency, and with this view, the purification of goods constitutes a part of every rigid sanatory system.

The articles most liable to suspicion are those which might be applied to the service of a patient suddenly attacked—such as temporary bedding, covering, or other personal convenience. Soft and elastic substances, like wool, hemp, and cotton are of this kind. The texture, moreover, of these substances, is considered peculiarly favourable to the retention of infection.

But the danger to be apprehended from the common articles of merchandize is small, compared to that which may be expected from the ordinary clothing and bedding of persons coming from the sphere of contagion. Many of these stuffs have probably been exposed to the taint of infection for a considerable time. Some of them may have been worn or lain upon by patients in severe symptoms, or during the progress of recovery, and they may possess an infecting power over strangers, although their owners wear them with impunity.*

Goods arriving in English ports are submitted to the process of purification on board of ships

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* An extraordinary Medical Committee established at Moscow by order of the Emperor of Russia, were of opinion that goods could not communicate the infection of cholera. They argued "that convalescents have continued to wear clothes which they wore during the disease, even furs, without having been purified, and they have never had a relapse."—*History of the Epidemic Spasmodic Cholera, by Bisset Hawkins, M.D.*

This is a good specimen of the manner in which a scientific question is settled by a *majority*. Had the committee been aware of the law of predisposition, they would have known that to contract the disease a *second* time was rather an unusual occurrence.

called "floating lazarèts." These are old vessels of war fitted up for the quarantine service, and stationed at Standgate Creek, &c. When a trading vessel arrives from a place infected, she is ordered to the quarantine station, where the suspected portion of her cargo is taken out and removed to a floating lazarèt. In the lazarèt, it is opened up and exposed between decks to the fumes of chlorine, and to the currents of air admitted through the ship's ports.

This does not appear* to be the most efficient mode of purification that might be adopted. As the operation is conducted *between* decks, there is not a liberal admission of *light*. Now, we would place more dependence in the powers of light as a disinfecting agent than in those of chlorine. Light and heat (apart from moisture) are two of nature's chief disinfectants, and it may be presumed, that they are energetic. It is very doubtful if chlorine have any power to neutralize contagion itself, though it may have power over the

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* Our observations on quarantine relate to the *measures* alone. We have reason to believe that Sir William Pym, the medical gentleman at the head of this Department, is a highly efficient officer.

elements of which contagion is composed. The result of continental practice does not seem favourable to chlorine.

The plan which we would recommend for the purification of goods (probably a much cheaper one than the present) is the following :—

Let temporary wooden buildings be erected. Let these buildings be kept constantly heated in the interior, and let them be provided with the means of being opened on all sides, so as to admit of the free ingress of light and unimpeded ventilation. It may be assumed that contagion is a gaseous compound, and the probable advantages of the preceding plan would be—that the heat would expand the contagious vapour, and the air admitted in free ventilation would be the more likely to dissipate it. The heat and light together would favour its decomposition. The fumes of chlorine might be added, if thought serviceable.

The period most favourable to the introduction of cholera into England has not yet arrived. It is when the disease reaches the opposite coast of France and the Netherlands, that this calamity is to be particularly apprehended. The quaran-

tine restrictions on the person should then be doubly vigilant, and their duration, perhaps, never under twenty days.*

While the cholera was limited to the ports in the Baltic, the probability was, that vessels trading to these ports would seldom reach the coast of England, with the acute disease actually existing on board. Such vessels contained few hands, and they lay for a considerable time in the infected harbours. The persons, therefore, who were in a state of predisposition, would in general be carried off before the vessels left these harbours.

But it will, in all likelihood, happen otherwise, when the cholera appears in the adjacent ports of France and the Netherlands. The intercourse between them and England is constant, and the voyage exceedingly short. In addition to the intercourse maintained by trading vessels, numerous

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* Twenty days is probably the longest term that can, in reason, be imposed upon persons in apparent health; but when persons arrive from infected places, with symptoms of common fever or affections of the bowels (as dysentery, diarrhœa, &c.), appearances which *chronic* cholera often assumes, the period of their quarantine must be extended to the complete cessation of these symptoms, and until twenty days have expired after their complete cessation.

passengers will be arriving in steam-packets from these countries. Now, should cholera break out on board of the latter during the passage, or while they are performing quarantine, how will the present precautionary system operate?

Sanatory regulations ought to be framed so as to protect the public interest, with the least possible injury or distress to the individuals falling under their supervision. When, then, one or two cases have occurred on board a vessel crowded with passengers, will it not be cruel to compel the healthy persons to remain on board *that* vessel during a long period of quarantine, exposed to the contagion, and under the depressing influence of fear and confinement? Should not a plan be devised for separating the healthy from the sick?

When the period of quarantine has expired, we think that before the suspected persons are permitted to go at large, their wearing-apparel should be submitted to free purification; and, in addition, that they, themselves, before resuming their purified dress, should undergo the cleansing of a bath—for if the contagion have adhered to, and been preserved in their clothes, may it not also adhere to the surface of their bodies?

In leaving the subject of cholera, for the present, it grieves us that we cannot entertain the opinion expressed by some able writers, that the salubrity of our climate is capable of moderating the virulence of the disease. During the lapse of fourteen years, the symptoms have retained their original malignity, uninfluenced by the seasons, in every part of the globe hitherto invaded. The large and numerous cities and towns of Great Britain, their dense population, divided, in a great measure, into two classes—the rich and the poor—the former debilitated by luxury, the latter, by poverty, and the unhealthy labours of manufacture—prepare a field, to all appearance, the most fitting for the destructive ravages of the contagious cholera. We indulge, then, the hope that His Majesty's Government, while engaged in the stormy politics of this period, will not forget the magnitude of the pestilential danger; and that every sanatory precaution will be enforced, which can rationally be expected to strengthen the natural advantages bestowed upon the country by its insular position.

APPENDIX.

GENERAL SUMMARY

OF THE

SYMPTOMS OF CHOLERA,

AS GIVEN BY

MR. SCOT, *Writer of the Report of the Medical Board of Madras.*

DESCRIPTION OF CHOLERA.—The invasion of cholera generally takes place in the night, or towards morning. The patient is sick at stomach, he vomits its contents, and his bowels are at the same time evacuated. This evacuation is of a nature quite peculiar to the disease; the entire intestinal tube seems to be at once emptied of the fœcal or solid matters, and an indescribable, but most subduing feeling of exhaustion, sinking and emptiness, is produced. Faintness supervenes, the skin becomes cold, and there is frequently giddiness and ringing in the ears. The powers

of locomotion are generally soon arrested; spasmodic contractions, or twitchings of the muscles of the fingers and toes are felt, and these affections gradually extend along the limbs to the trunk of the body. They partake both of the clonic and tonic spasm, but the clonic form chiefly prevails. The pulse, from the first, is small, weak and accelerated, and after a certain interval, but especially on the accession of spasms, or of severe vomiting, it sinks suddenly, so as to be speedily lost in all the external parts. The skin, which from the commencement of the disease is below the natural temperature, becomes colder and colder. It is very rarely dry: generally covered with a profuse cold sweat, or with a clammy moisture. In Europeans it often partially assumes a livid hue, the whole surface appears collapsed, the lips become blue, the nails present a similar tint, and the skin of the feet and hands becomes much corrugated, and exhibits a sodden appearance. In this state the skin is insensible, even to the action of chemical agents, yet the patient generally complains of oppressive heat on the surface, and wishes to throw off the bed-clothes. The eyes sink in their orbits, which are surrounded by a livid circle, the corneæ become flaccid, the conjunctiva is frequently suffused with blood; the features of the face collapse, and the whole countenance assumes a cadaverous aspect, strikingly characteristic of the disease. There is, almost always, urgent thirst, and desire for cold drinks, although the mouth be not usually parched. The tongue is moist, whitish and cold. A distressing sense of pain,

and of burning heat at the epigastrium, are common. Little or no urine, bile, or saliva is secreted. The voice becomes feeble, hollow and unnatural. The respiration is oppressed, generally slow, and the breath is deficient in heat.

During the progress of these symptoms the alimentary canal is very variously affected. After the first discharges by vomiting and purging, however severe these symptoms may be, the matter evacuated is always watery, and in a great proportion of cases it is colourless, inodorous, and often homogeneous. In some it is turbid, resembling muddy water; in others it is of a yellowish or greenish hue. A very common appearance is that which has been emphatically called the "congee stools," an appearance produced by numerous mucous flakes floating in the watery or serous part of the evacuation. The discharges from the stomach, and those from the bowels, do not appear to differ, except in the former being mixed with the ingesta. Neither the vomiting nor the purging are symptoms of long continuance. They are either obviated by art, or the body becomes unable to perform these violent actions; and they, together with the spasms, generally disappear a considerable time before death. If blood be drawn it is always dark, or almost black, very thick, ropy, and generally of slow and difficult effusion. Towards the close of the attack jactitation comes on, with evident internal anxiety and distress, and death takes place, often in ten or twelve, generally within eighteen or twenty hours from the commencement of the attack.

During all this mortal struggle and commotion in the body, the mind remains clear, and its functions undisturbed almost to the last moment of existence. The patient, though sunk and overwhelmed, listless, averse to speak, and impatient of disturbance, still retains the power of thinking, and of expressing his thoughts, as long as his organs are obedient to his will. Such is the most ordinary course of cholera asphyxia, when its tendency to death is not checked by art.

A favourable issue is denoted by a rising of the pulse, a return of heat to the surface, inclination to natural sleep, and a diminution or cessation of vomiting, purging and spasms; these indications being succeeded, after an interval, by the re-appearance of fœcal matter in the stools, of bile, of urine, and of saliva.

Varieties in Particular Symptoms.—Vomiting is a prominent symptom of cholera; but there are numerous instances on record where it has been entirely absent. In certain epidemic visitations, even scarcely an individual case has manifested this symptom. In some cases the stomach appears to be freely and perfectly emptied, prodigious quantities of watery fluid being ejected occasionally with great force. This fluid sometimes resembles what is discharged in pyrosis, at other times it is glairy and ropy. In other cases the stomach seems to have lost the power of freely ejecting its contents; there is an ineffectual straining to vomit, and a spouting up of any fluid which

is swallowed, as if by an effort of the lower part of the œsophagus, rather than of the stomach itself. When full vomiting in these cases has been effected by medicine, relief follows; not, however, in all probability, by the mere evacuation of the gastric contents, but as a consequence of that change in the condition of the patient which must necessarily be established before the stomach can resume the action of vomiting. Vomiting is sometimes altogether absent, or, if it has been present, soon ceases from an atonic state of the stomach, under which that organ receives and retains whatever may be poured into it, as if it were really a dead substance. This is a most alarming state, in comparison with the utmost irritability, as almost any other imaginable condition of the part may be held to be of little danger. * * *

Purging is a more constant symptom of cholera than vomiting, and in a majority of cases it is the first in the order of occurrence; but being a less striking deviation from a state of health than vomiting, which instantly arrests the attention, it has usually been treated of in succession to it. This symptom has very rarely been altogether absent; but there seems no reason to doubt that this is sometimes the case. Its absence appears indeed to denote a peculiar degree of malignancy in the attack. The accounts given by the patients, however, in respect to their alvine evacuations, are not to be implicitly believed. Their attention is not always drawn to the

nature of the discharge, and they are apt to convey very erroneous notions on the subject to the medical attendant. In cases where little or no purging has taken place during life, the intestines have yet been found after death to be filled with the conjee-like matter, as if they had wanted energy to throw it off, or as if a stricture had been formed on the lower portions of the gut. The intestinal canal appears to be subject indeed to the same influences, and its contents appear to vary, as has been stated to be the case with the stomach ; with this exception, that it seems always to have the power of emptying itself of its *natural* contents, at the commencement or during the progress of the disorder. This inference is drawn from the accounts of dissections, for we find no instance recorded of fœces remaining, unless in very protracted cases, when the primary disease has been overcome. The dejections are sometimes made without effort or uneasiness, at others they are thrown out with great force, which has been compared to the squirt of a syringe. They also sometimes take place simultaneously, with vomiting, spasm, and stoppage of the pulse, as if all these affections originated at the instant, from one common cause. There is seldom much griping or tenesmus, although the calls are very sudden, and are irresistible. Pain on pressure of the abdomen is only occasionally noticed. In advanced stages of the disease purging generally ceases, but in many cases a flow of watery fluid from the rectum takes place on any change of position. The matters evacuated after the first emptying

of the bowels, have been occasionally observed to be greenish, or yellowish, turbid, of a frothy appearance, like yeast; * * * but by far the most common appearance is that of pure serum, so thin and colourless, as not to leave a stain on the patient's linen. The next in order of frequency is the conjee-like fluid; the mucus is at times so thoroughly mixed, however, with serum, as to give the whole the appearance of milk or chyle.* * * The re-appearance of fœcal matter, especially if tinged with bile, seldom, perhaps never, takes place till the disease has been subdued. * * *

Animal Functions. * * *

Instances are not wanting of patients being able to walk, and to perform many of their usual avocations, even after the circulation has been so much arrested that the pulse has not been discernible at the wrist. Much seems to depend on the constitutional strength and firmness of mind in the patient, and on the form in which the disease has made its attack. The cases here alluded to are those chiefly in which it has begun by an insidious watery purging; and many lives have been lost in consequence of the patients under these fallacious appearances not taking timely alarm, and applying for aid. In other cases, again, the animal functions appear to have been early impaired, and the prostration of strength to have preceded most of the other symptoms.

Spasm has been held to be so essential a feature of that species of cholera of which we are treating, as to confer on it a specific name. In so far, however, as relates to the muscles of voluntary motion—and it is that description of spasm only which we mean here to treat of—no symptom is more frequently wanting. Spasms of the muscles chiefly accompany those cases in which there is a sensible and violent commotion in the system. Hence they are more frequently found in European than in native patients, and in the robust of either than in the weakly. In the low and most dangerous form of cholera, whether in European or native cases, spasm is generally wanting, or is present in a very slight degree. The muscles most commonly affected are those of the toes and feet, and calves of the leg; next to them, the corresponding muscles of the superior extremities; then those of the thighs and arms; and, lastly, those of the trunk—producing various distressing sensations to the patient. Among these, hiccough is not unfrequent; but it has been observed that this symptom in cholera is not at all indicative of danger. The muscles of the eye-balls have not been observed to be affected with spasm, unless the sinking of these organs in their orbits may be considered to be an effect of it. The reports make frequent mention of a remarkable permanent contraction of the muscles of the abdomen, by which the belly is drawn towards the spine. The spasms attending cholera are of a mixed nature, not strictly clonic; the relaxations being less prompt and frequent than in epilepsy or convulsion,

and seldom durable, as in tetanus. The contractions of the muscles are invariably attended with pain; and some medical officers have observed that a degree of spasmodic stiffness has continued for several days afterwards. It has also been remarked that spasmodic twitchings of the muscles have taken place after death, and have continued for a considerable time. In one case, where a man had been paralytic in his limbs, with a total numbness of them, they were severely affected with spasms, and became exquisitely sensible. * * *

Collapse.—Of all the symptoms of cholera, none is so invariably present—none, indeed, so truly essential and diagnostic, as the immediate sinking of the circulation. It must, nevertheless, be admitted, that, where instant remedial measures have been successfully practised, this symptom may not have developed itself; and that there are even cases where an excited vascular action has been observed to accompany the first movements of the system in cholera. Some intelligent practitioners have entertained doubts whether such cases belong indeed to this disease; and there seems reason to imagine that those inflammatory affections with spasm, known in this country, and alluded to in several reports, may, in some instances have been mistaken for it. It is further to be remembered, that these are precisely the cases which yield most certainly and readily to our remedial means; and it consequently fol-

lows, that a medical man can seldom have the opportunity of observing whether or not this form of cholera will degenerate into the low stage. There is, however, direct evidence in support of the fact, that they have so degenerated, and gone on to a fatal termination. In the case of soldiers, too, in whom such symptoms have chiefly appeared, we must make some account of the quantity of spirits usually drank by them at the commencement of the disease, producing an effect on the circulation. The period at which a marked diminution of vascular action takes place, is somewhat various. The pulse sometimes keeps up tolerably for several hours, though very rarely. It more generally becomes small and accelerated at an early stage, and, on the accession of spasm or vomiting, suddenly ceases to be distinguishable in the extremities. The length of time during which a patient will sometimes live in a pulseless state, is extraordinary. Dr. Kellett relates a case where the pulse was gone within three hours from the attack; yet the man lived in that state from the 3d of October, at 4 P. M., to the 6th, at 2 P. M. On the cessation of the spasm or vomiting, and sometimes, apparently, from the exhibition of remedies, the pulse will return to the extremities for a short time, and again it will cease. The superficial veins and arteries are not always collapsed even when the pulse has ceased. If these vessels be opened in this condition, the contained blood flows out; their walls then collapse, and no more blood can be extracted. There is

no authenticated fatal instance of cholera on record, where the circulation has not been arrested, in the extremities at least, long before death took place. * * *

Thirst and Sense of Heat in the Epigastrium.—Thirst and sense of heat or burning in the region of the stomach, are generally connected together, and form very prominent and constant symptoms of cholera. Yet not only in individuals, but even in epidemic invasions, these symptoms have often been altogether wanting. Even when they are present in the highest degree, the mouth is not often parched, nor the tongue often dry: on the contrary, there seems, in general, no want of moisture; and while, as Mr. Jameson observes, "all is burning within, these surfaces are cold and blanched." At times, however, the mouth is parched, and the tongue dry and furred; but practitioners seem doubtful whether any practical inference is thence to be drawn. What would be the state of these parts if calomel, ardent spirits, laudanum, and spices were as largely employed in health, or in many common diseases, as in cholera, with as scanty a use of diluents? * * * When thirst *is* present, it seems to subdue all other feelings; and the ignorant soldier, as well as the medical man, who firmly believes that cold water is almost certain death, alike eagerly seek and swallow it. * * *

State of the Skin.—The state of the skin in cholera is, in general, what we might expect to find it in

patients labouring under such affections of the alimentary canal, and with the subdued circulation which takes place in that disease. It is cold, generally clammy, and often covered with profuse cold sweats. Nevertheless, varieties occur in this, as in the other symptoms of cholera. The skin is sometimes observed to be dry, though cold; and sometimes of natural—nay, in some rare instances, of preternatural warmth. An increase of temperature has been repeatedly observed to take place just before death; but the development of heat appears to be confined then to the trunk and head; and, in almost all cases, this *partial* development of heat is found to be a fatal symptom. It is entirely unconnected with any restoration of the energy of the arterial system, or any improvements in the function of respiration. The heat, in such instances, has been observed to continue considerably for some hours after death.

The sensation imparted by touching the skin of a person ill with cholera is very peculiar, and reminds one of that imparted by a dead body. The skin, when much collapsed, becomes insensible even to the action of chemical agents; and hence the usual vesicatories fail in producing any effect. The application of mineral acids and of boiling water, in this condition of the skin, produces little or no effect; and some patients are said not to have been sensible to the operation. * * *

At a very early stage in cholera, leeches can procure little or no blood from the skin. * * * When the sweat is thin, it is usually poured out, in large quantity, from the

whole surface of the body; but, when thick or clammy, it is more partial, and generally confined to the trunk and head. * * *

Countenance.—That remarkable shrinking of the features of the face which has acquired the emphatic term of "the true cholera countenance," appears in every case not quickly cut short by medicine; but the degree in which this symptom may be present will be differently estimated, according to the natural contour of the patient's features. This expression of countenance, which conveys too truly that of death itself, cannot be mistaken; and, by an attentive observation, it will be perceived that a similar shrinking takes place throughout the limbs and all projecting parts of the body. The eyes not only become dim, and the corneæ flaccid, but there appears to be an actual formation of a substance, like a film or membrane, in many cases, shewing that this species of surface still possesses secreting powers. The abdomen has sometimes been observed to be tumid, but more frequently drawn towards the spine. The general apparent reduction of bulk cannot, however, be considered as proportionate to the volume of fluids thrown out, nor, indeed, to depend essentially on that circumstance, as it occurs equally under the most moderate discharges.

Respiration.—Respiration is not usually interrupted in the early stages of cholera, unless from a peculiarity in

the mode of attack, under which spasm seizes the muscles subservient to that function. In many cases terminating in death, respiration has gone on in its mechanical part with little or no interruption, except that it becomes slower and slower; and an instance has been recorded where this function was performed only seven times in the minute. Numerous cases, on the other hand, are noticed, especially in Europeans, where the interruption of respiration was most distressing, and could only be compared to the most violent attacks of asthma. Although the breath is stated in many of the reports to have been deficient in heat, it is not clear that this was a general symptom; nor is it understood that this coldness was more particularly observed in cases of difficult and laborious respiration, than in those where the function seemed to be, at least mechanically, performed without interruption.

Jactitation.—With respect to restlessness, or jactitation, it is more common with Europeans than with natives. In cases of such sudden and dangerous illness, we must make some allowance for moral, as well as physical disquietude; and it is certain that in very many cases death approaches, while the patient lies in the most complete tranquillity. When much restlessness prevails, it is probably connected with some great oppression of particular organs; and though the absence of this symptom is not, in itself, to be depended upon as affording grounds for a favourable prognosis, its presence is always highly alarm-

ing. The voice, in general, partakes of the debility prevailing in other functions, and it is usually noticed as being feeble, often almost inaudible. Yet instances are not wanting where the voice has continued of natural strength almost to the last moment.

Functions of the Sensorium.—In a disease so highly congestive as cholera, where vertigo, deafness, ringing in the ears, often prevail, and where very large quantities of opium and intoxicating matters have been swallowed, it is truly surprising that the functions of the sensorium are so very rarely disturbed. It seems probable, that it is in many instances from an inaccuracy of language, that coma has been represented as a symptom of cholera, for we find that patients who have just been represented to be in a *comatose* state, can with more or less facility be roused from it; and, though he cannot overcome that retirement within himself which constitutes so remarkable a feature of the disease, he will yet evince, by the clearness and precision of his answers, that his intellect is not destroyed. * * * Coma must, however, be admitted, occasionally to occur, especially towards the termination of the case, when it is fatal; but delirium has seldom or never been observed, unless among the sequelæ of cholera, when other and foreign morbid actions have been established; that degree of incoherence which has accompanied the excessive spasmodic affections of the muscles, or which has followed

the free use of opium and spirits, is not considered an exception to this remark.

Syncope is not a common symptom in cholera, and when it has occurred, unless after venesection, it has generally been on the invasion of the disease. During the progress of this disorder, when the nervous energy seems to be almost annihilated, and the functions of the heart and arteries to be abolished, this symptom is yet very rarely observed. Deafness has been remarked, in some instances, to have been completely established before any other symptom of the disease had developed itself, the patient continuing some time to pursue his ordinary employments.

URINE.—In cholera, the secretion of urine, like all the other natural secretions, appears to be very generally suspended: this, indeed, has been considered so much a matter of course, that practitioners have very frequently not noticed it in their reports; but whenever the secretion has appeared to be going on, the circumstance is particularly mentioned. When cholera first appeared, attempts were often made to relieve the patient by the catheter. * * * When this secretion is not suspended during an attack of cholera, the urine is almost always limpid and clear, though in very small quantity. * * *

It has been remarked, that the cases, in which urine appeared to be secreted, were not less dangerous than those where this secretion was entirely suspended; but it is much

more generally observed, that the appearance of urine, especially when this is the result of *restored* secretion, is always a most favourable omen. In many cases, the secretion of urine has not been restored, before a period of fifty hours had elapsed from the commencement of the attack; and it has even been reported, that during a local prevalence of cholera, the secretion of urine has been in some individuals entirely suppressed, although no other derangement of the health took place. Instances of this kind were generally observed during great heats, and under much fatigue.

State of the Blood.—No symptoms of cholera are so uniform in their appearance and progress as those connected with the blood and its circulation. * * The blood of persons affected with cholera is of an unnaturally dark colour and thick consistence. These appearances are very uniformly expressed by the terms, dark, black, tarry, in regard to colour; and by thick, ropy, syrupy, semi-coagulated, in respect to consistence. The change in the condition of the blood is likewise fully proved to be in the ratio of the duration of the disease; the blood at the commencement seeming to be nearly, or altogether, natural, and more or less rapidly assuming a morbid state as the disease advances. Some very rare cases are recorded where, however, this morbid state of the blood was not observable, although the disease had been for some time established; and instances have occurred

where the blood flowed readily, sometimes little altered, where, nevertheless, death ultimately ensued. The abstraction of blood has been found by all practitioners to be very difficult and uncertain: and the uncertainty has been variously imputed to the feebleness of the circulation, to the thick consistence of the blood, and to the combined operations of these causes. The blood drawn from patients suffering from cholera is stated to be generally very destitute of serum, never to exhibit the appearance of buff, and to be generally disposed to coagulate quickly. Several instances, however, have occurred where the coagulation was slow and imperfect. A great majority of the reports state, unequivocally, that after a certain quantity of dark and thick blood has been abstracted from a patient under cholera, it is usual for its colour to become lighter, its consistence to become less thick, and for the circulation to revive; such appearances always affording grounds for a proportionably favourable prognosis. In many instances however, no such changes have been observed to accompany the operation of bleeding, while yet the result was favourable. The blood is generally found to be less changed in appearance in those cases of cholera, which are ushered in with symptoms of excitement, than where the collapsed state of the system has occurred at an early period. The blood has been occasionally found, on dissection, to be of as dark a colour in the left as in the right side of the heart, affording reason to believe that, in the whole arterial system, it was equally changed. The

temporal artery having been frequently opened, the blood was found to be dark and thick like the venous blood; but it would appear that this operation has not been performed in general, until the attempts to procure blood from the brachial or jugular veins had failed; little or no blood could be obtained, the artery merely emptying itself in a languid stream, not in a jet, and then collapsing.* * * When reaction has been established the blood occasionally shews the buffy coat.

Diagnosis.—The diagnosis in cholera is seldom involved in any considerable difficulty or obscurity. The most important distinction is that between the two species of cholera—the cholera biliosa, and the cholera asphyxia, especially that form of the latter, which is primarily attended with symptoms of excitement. Where the evacuations are tinged of a yellow or greenish hue, where the matter vomited is bitter to the taste, while the skin remains warm and the pulse good, the disease may be regarded as bilious cholera, commonly so called; but where, after the first emptying of the primæ viæ, the evacuations are of a watery consistence, colourless, turbid, or white; when no urine is voided, where the surface becomes cold, where the features are collapsed, where the spirits are greatly depressed, and where the pulse quickly flags, the case may almost certainly be regarded as cholera asphyxia. As the disease advances, the cessation of the pulse in the arteries of the extremities, the shrivelled and corrugated skin of

the hands and feet, the restlessness, deafness, and general depression, leave no doubt of the nature of the disease. Many affections denominated nervous, such as syncope, cholic, hysteria, dyspepsia, spasm of any kind, and the cold stage of fevers, are apt, during the prevalence of cholera, to create an alarm of it. * * * Cases of cholera sometimes, apparently, commence by an insidious diarrhœa; or supervene on the action of purgatives, especially saline purgatives, and are then exceedingly apt to be mistaken, both by the patient and his physician. All the experience which we have yet had leaves the mind much in doubt whether this diarrhœa be a primary symptom, or merely indicates a predisposition to the disease. The same observation applies to the effect of purgatives. In such difficult cases much may be inferred from the state of the epidemic influence prevailing at the time. If cholera be prevalent, they will generally attract immediate notice, and it is the safest course to treat them as cholera; but many of our most lamented casualties have happened from seizures of this description, which were solitary, and altogether unsuspected by the sufferers till too late. There seems, however, to be something peculiar to cholera, in blinding the patient to the real nature of his case: or perhaps conscious of the tendency of some of his symptoms, he seeks to repress the conviction, and is unable to admit or believe that, with little sensible disturbance of health, he already stands on the verge of his grave.

Recovery.—When medical aid is early administered, and when the constitution is otherwise healthy, the recovery from an attack of cholera is so wonderfully rapid, as perhaps to be decisive of the disease being essentially unconnected with any organic lesion. In natives of this country, especially, in whom there is ordinarily very little tendency to inflammatory action, the recovery from cholera is generally so speedy and perfect, that it can only be compared to recovery from syncope, cholic, and diseases of a similar nature; but in Europeans, in whom there is a much greater tendency to inflammation, and to determinations to some of the viscera, the recovery from cholera is by no means so sudden or so perfect. On the contrary, it is too often involved with affections as various as the diseases of these viscera are known to be in this climate. The most frequent of the sequelæ of cholera are affections of the intestines, of the brain, of the liver, and of the stomach. When cholera, however, is of long continuance, and when the congestion appears to have been thoroughly established, few, either Europeans or natives, who outlive the attack, are restored to health without considerable difficulty.

It has been already remarked, that recovery from an attack of cholera is indicated by the return of heat to the surface of the body, and the rising of the pulse. A deceitful calm, however, sometimes attends these favourable appearances, which too often mocks our hopes and expectations. When the disease is characterised by violent morbid actions, the diminution or cessation of these, however sud-

den, may generally be regarded as the usual mode in which nature conducts the patient to recovery; but in what may be termed negative symptoms, the steps to recovery are extremely dark and obscure, the evolution of natural heat, and arterial action, have occasionally been noticed as amongst the last of the functions which are restored. Patients have been observed to remain for one, two, and even three days, in a state of the greatest collapse, and yet, contrary to all expectations, have recovered.

Sequelæ.—(From the Bengal Report written by Mr. Jameson.) Among natives generally, where the attack was exceedingly severe, the constitution sunk with scarce any attempt to rally, and of those who recovered, the secondary stage was of short duration, and unaccompanied with much reaction. In the milder cases, the attack either was repelled by the unaided powers of life itself, or readily gave way to the simplest means of cure. The pathognomonic symptoms of the disease speedily abated, the patient sunk into a profound and quiet sleep, and the breaking out of a warm equable perspiration over the body, evinced the restoration of the vital powers, and might be considered almost an infallible sign of recovery. In such cases slight debility and irregular action of the intestinal canal were the only ill consequences of the attack, and a copious discharge of bile or feculent matter, either natural, or procured by the exhibition of a single dose of a simple purgative, completed the cure.

But in the more violent forms of the disease, recovery

was longer protracted, and the sufferings of the patient were more severe. After the most distressing symptoms had been in a great measure subdued, he was still harassed by constant thirst, irritability of stomach, pain and soreness of the epigastric region, watchfulness, and confused dreams. The stomach and bowels did not for a long time regain their usual tone; and the frequent occurrence of obstinate dysentery or diarrhœa proved, that almost irreparable mischief had been done to the whole of the chylopœtic viscera. In these cases the debility was great, and of long duration; and the strictest attention was required during many days to prevent the patient from sinking entirely.

It was almost uniformly observed, that health was soonest restored in those cases in which feculent black and acrid motions were early procured; and, on the other hand, their absence was almost uniformly marked by feverishness, sour eructations, flatulence, constipation, and other signs of want of tone and sluggish action of the hepatic system. Fevers of the remittent, and intermittent type were among the most frequent sequelæ of the disorder; but among natives, and especially those of weakly frame, they could not be considered to form an essential part of the attack. They were hardly ever immediately superinduced upon the collapsed stage, and seemed rather an incidental affection in bodies much predisposed to take on new forms of disease by great existing debility.

When the disease ran its full course with Europeans,

and with natives of robust athletic make, the following appearances generally presented themselves. What may be termed the cold stage, or state of collapse, usually lasted from twenty-four to forty-eight hours, and was seldom of more than three complete days' duration. Throughout the first twenty-four hours nearly all the symptoms of deadly oppression, the cold skin, and oozing of clammy sweat from every pore, the feeble pulse, occasional vomiting, purging and cramp, the thirst and anguish, continued undiminished. Then the system shewed signs of revival, the vital powers began to rally, the circulation and heat to be restored, and the spasms, sickness, and desire to go to stool to be considerably lessened. The warmth gradually returned, the pulse rose in strength and fulness, and then became sharp and sometimes hard: the tongue got more deeply furred, the thirst continued with less nausea, the stool swere no longer like gruel or rice-water; they, usually between the third and sixth day, became first brown and watery, then dark green, black and pitchy, and the bowels during many days continued to discharge immense loads of vitiated bile, until, with returning health, the secretions of the liver and other viscera gradually put on a natural appearance. * * * It was remarked, that where the motions consisted of a chocolate-coloured fluid, with flocculi swimming in it, the patient rarely recovered.

The fever, which almost invariably attended this stage of the disease, may be considered to have been rather the

result of an effort in nature to recover herself from the rude shock which she had sustained, than as forming any integrant and necessary part of the disorder itself. It partook much of the nature of the common bilious attacks of those latitudes. There was the hot dry skin, the foul deeply-furred dry tongue, parched mouth, thirst, sick stomach, depraved secretions, restlessness, watchfulness, and the quick variable pulse sometimes with delirium, stupor, and other marked affections of the brain.

Generally, when the disorder proved fatal, after reaching this stage, the tongue, from being cream-coloured, got brown, and sometimes black, hard, and more deeply furred; the teeth and lips were covered with sordes; the state of the skin varied, chills alternating with heats; the pulse became extremely weak and tremulous; hiccough, catching of the breath, great restlessness, and deep moanings, succeeded, and the patient soon sunk, incoherent and insensible, under the debilitating effects of low nervous fever, and frequent dark, tarry alvine discharges.

In other cases, this secondary period ran a somewhat different course. As the action of the heart and arteries was renewed, and the natural warmth of the body returned, an unusual degree of energy succeeded. The brain was evidently affected, and the patient was quite insensible to the great danger into which he had fallen. The pulse rose as high as 120; great heat, especially over the lower cavities, was complained of. There was extreme agitation and distressing thirst. The patient continually called for cold

water to relieve the burning sensation of the abdomen. Sometimes a warm perspiration broke out near the wrists and forehead, which afforded temporary relief to his sufferings. To this state of excitement, that of collapse quickly succeeded. There was then great prostration of strength; the bowels became quite torpid; severe pains occurred low down in the abdomen, near the site of the rectum, which were always aggravated upon stools being procured by medicine. The state of the stomach now excited surprise; its unnatural irritability was entirely gone, and the most nauseating medicine could be poured into it without exciting vomiting. It rarely occurred that the patient survived the great sinking produced by this stage, and even where good fortune and the strength of his constitution carried him through, he suffered long after from debility and disordered bowels.

Appearances on Dissection (as given by Mr. Scot). —Dissections have been chiefly made on the bodies of European soldiers, a class of men acknowledged to be peculiarly liable, in this climate, to visceral disease of all kinds. Under these circumstances, dissection reports should be viewed with care, in reference to the general state of morbid bodies, and with the most attentive consideration of the precise import of the terms employed.

The external appearance of European subjects, who have sunk under cholera, closely resembles that which has been noticed as taking place during life. The surface is livid,

the solids are shrunk, the skin of the hands and feet is corrugated. There seems no sufficient evidence of any uncommon tendency in the body to putrefaction after death, nor of any characteristic fœtor from the abdominal cavity. No particular morbid appearances have been found in any of the cavities of the body, which are lined with *serous* membranes, or in these membranes themselves. The cavities of the pleura, of the pericardium, and of the peritoneum, have almost uniformly been found in a natural state: or the deviations from that state have manifestly had no connection with cholera. The surfaces which are lined or covered with *mucous membranes*, have, on the contrary, very generally exhibited signs of disease. These will be noticed as the organs connected with them come to be mentioned.

The lungs have not unfrequently been found in a natural state, even in cases where much oppression had existed previously to death. Much more generally, however, they have been found either to be gorged with dark blood, so that they have lost their characteristic appearance, and have assumed more that of liver or spleen, or they have been found to be in the opposite state; that is, collapsed into an extremely small bulk, and lying in the hollow on each side of the spine, leaving the cavity of the thorax nearly empty. * * * The blood found in the lungs has been always very black. The heart and its larger vessels have been found to be distended with blood, but not so gene-

rally as the apparent feebleness of their propelling power, and the evident retreat of the blood to the centre would have led us to expect. The right auricle and ventricle being gorged with blood is nothing peculiar to cholera, but some dissections have shewn the left cavities to be filled even with dark or black blood, which we may reckon as a morbid appearance more peculiar to it. In the abdominal cavity the peritoneal coverings of the viscera, being *serous membranes*, present in general but little deviation from the healthy state; occasionally, indeed, the morbid accumulation of blood in the vessels of the viscera imparting an appearance of turgidity, and blueness is evident on their exterior surfaces. We also find them bearing marks of inflammation, especially where the patient may have lingered long before death. In other cases the whole tube has had a blanched appearance, both externally and internally. The stomach and intestines generally preserve their ordinary volume. The appearance of the omentum is not sensibly affected in cholera. The stomach is found to be so variously affected as to destroy all grounds for pathological reasoning. It is very rarely found empty or much contracted after death, nor has any appearance of spastic stricture of the pylorus been often detected. It has, however, sometimes occurred. Its contents appear to be chiefly the ingesta in an unaltered state. In some cases greenish, or yellow, or turbid matters are found. * * * Various appearances, either of active inflammation, or a

congested state of the vessels, have been noticed, sometimes in one part, and sometimes in another. The parts seem as if they were sphacelated, thickened, softened, and friable, and in short exhibit so great a variety of appearances, from a perfectly natural state to the most morbid, that no particular light is thrown by them on the disease.

The intestinal tube is sometimes collapsed, but oftener found to be more or less filled with air, distended in some parts into bags or pouches, containing whitish, turbid, dark, or green-coloured fluid; and in others, presenting the appearance of spastic constriction. The latter, however, is not common. No fœcal or other solid matters are found in the intestines; but very commonly large quantities of the conjee-looking fluid, or of turbid, serous matter. The duodenum, and occasionally the jejunum, have been found loaded with an adherent whitish, or greenish mucus; at other times, they have been found seemingly denuded of their natural mucus; and often perfectly healthy. Traces of bile in the intestines, or of any substance apparently descended from the stomach, are exceedingly rare. Sanguineous congestion, and even active inflammation, are stated to be more common in the bowels than in the stomach; but, on the other hand, instances are very numerous where no such indications have been detected. The thoracic duct is stated to have been empty of chyle. The liver has been commonly found to be gorged with blood, but not always. It is an organ usually very vascular, and it would pro-

bably demand a nicer discrimination than has been bestowed on the subject, to distinguish the degree of congestion in which it is naturally left by the settling of the blood after death, in ordinary diseases, from that which has been observed after an attack of cholera. The gall bladder has almost universally been found to contain bile, and in the great majority of cases even to be completely filled with it. As is usual with this secretion in cases of retention, it is of a dark colour. Very different states of the gall ducts have been described; cases of constriction and impermeability seeming to be equally numerous with those of an opposite character.

The urinary bladder is found, we may say, universally without urine, and very much contracted. The lining or mucous membranes of the bladder and ureters have been found coated with a whitish mucous fluid. * * * The appearance of the spleen, which is so various under the ordinary conditions of the body after death, has indicated nothing that can be mentioned as belonging to cholera. The vessels of the mesentery have been very generally found to be uncommonly full of blood.

In the head appearances of congestion, and even of extravasation, have been frequently observed, but not so uniformly, or to such an extent as to require any particular notice. Only one case has been given, where the state of the spinal marrow was examined. * * *

From this general view of the appearances found on

dissections of the bodies of persons who have died from cholera, it is manifest, that the information thence derivable is, in a pathological point of view, of a negative nature only. It is nevertheless of consequence in a practical sense, especially in treating the sequelæ of cholera.

THE END.

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